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Article on the Increasing Difficulty of Mining Anthracite, page 323

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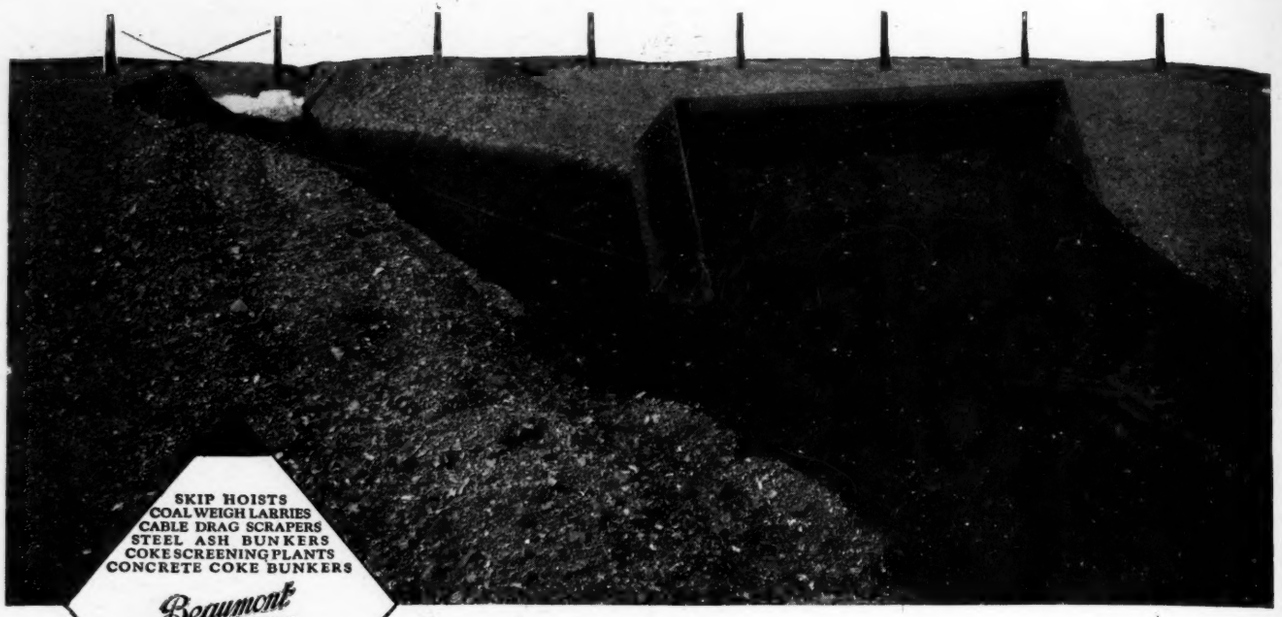

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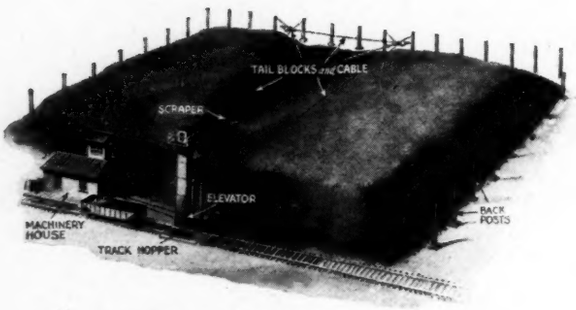

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COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

Volume 23 | NEW YORK, THURSDAY, FEBRUARY 22, 1923 | Number 8

Shades of George Baer!

IT IS a commonplace to designate certain among the labor side as radicals and thus to indicate they are disposed to turn things upside down, to destroy the present order of things and make the world over. The complacent majority always is more or less tolerant of the antics of the "reds" providing they are not too militant, the more philosophical probably conceding that it is healthful to be stirred to thought at times.

The ultra conservative and the radical are so far apart that they come together, as when East meets West. The ultra conservative lives in the past and has learned nothing of the present. It is but a step from his way of doing things to the way the radical would have them done. If we decry the radical, we must deplore the ultra conservative. If we would take issue with the element—it happens to be in labor—that would abolish capital and despoil the public for its own selfish ends, we also must take issue with the element—it happens to be in capital—that would override the rights of all others.

We are as disposed to dub the coal operator a radical who has no respect for the public or the rights of his fellow operators as we are the labor unionist who wants to take over the coal mines. The coal operator who is so steeped in his own ego that he consistently refuses such a measure of co-operation in an emergency as has been deemed reasonable by his fellow operators is as dangerous to the public welfare and the peace and good repute of the coal industry as any who wave the red flag. On his head rests more responsibility for unrest, suspicion and public condemnation than upon all the acts of all others combined. A policy of the "public be damned" no longer sets will in this country.

It is an unfortunate weakness in the present order of things that a whole group must appear to condone, if indeed it is not held equally at fault, for the policy of wilful obstinacy of one of its number. There is no means of discipline. There is but disappointment and chagrin that an otherwise good record of responsible coal operators for sensible, reasonable co-operation with the government should be marred by one of their number.

Canada's Share of Available Anthracite

MATTERS of fact and matters of policy are involved in the present controversy over the anthracite shortage in New York and New England and the embargo on shipments to Canada demanded by certain spokesmen from that territory. The matter of policy is easily and quickly disposed of. To all intents and purposes Canada is a part of the United States so far as coal is concerned. This question was threshed out during the war as well as in the 1919 strike, and Canada was treated as one of the states of our Union. Canada is entitled to her pro-rata share of our coal conditioned upon her following the same sort and degree of restrictions over its use and distribution as are imposed on this side. Happily it appears that this is the last word of the administration at Washington, for we are informed that no embargo will be imposed.

As regards the facts there remain some doubt, for we have not the complete story of anthracite distribution this year, the Hudson Coal Co., reputed to be a large shipper to Canada, having refused, according to the Federal Fuel Distributor, to divulge any data with respect to what it has done with its coal. But aside from the fact of whether that company shipped all its coal to Canada or none, there remains the fact that the communities in trouble are not asking for coal but are demanding anthracite.

The short supply of hard coal for householders has been pieced out this winter by millions of tons of substitutes, mainly soft coal. Those who accepted the situation and are using a reasonable share of other fuel are not making complaints to Congress. New England is sore over the coal situation. The Pennsylvania state tax, the strike, and now high prices at the curb and dirty coal, and not enough of it, have riled a people beset by an unusually hard winter. This has given opportunity for political play, and it also has given opportunity for spreading some sound truths about coal and the use thereof.

Kicking against the hard fact that a 60-per cent supply will not fill a 100-per cent requirement takes many angles.

Modern Silesian Mining Methods

SO MUCH has been said about German flushing methods that our readers will be much interested to find from the article by A. Gerke in this issue that the Silesian mine owners are not maintaining those methods but are tending toward systems such as we are following, that do not include flushing as part of the process.

The war seems to have changed the attitude of the Silesian coal operators so that they prefer to run the risk of losing a little coal to the unpleasant certainty that large sums of money would have to be spent should they fill their mines with waste rock and washer tailings. Whether we are justified in continuing our methods in the face of our waning anthracite supplies and lack of virgin coal territory is a matter that must, and will be, decided in the end upon other premises than German precedent, but the methods described by Mr. Gerke will be held by many to be a proof that the flushing method is expensive and justifiable only where the conservation of small quantities of coal and the protection of the surface are of more importance than conservation of labor.

The stockwork system described by Mr. Gerke is almost, or entirely, unknown in American coal mines. It is a suggestion nevertheless for those who operate beds on heavy pitches.

Recent Disasters and Their Lessons

REGRETTABLE indeed have been the recent explosions at Spangler, Dolomite, Dawson and Dunsmuir. It is to be hoped that their lessons will not be forgotten and that from them will come improvements in practice that will make explosions far less frequent. Of the Spangler and Dunsmuir explosions nothing will be said here. It is better to discuss only the other two, which were obviously and admittedly accidents resulting from coal dust.

Both occurred in mines which were admirably managed, but it would seem that in both too much confidence was shown in sprinkling, and here it should be conceded that in both mines the word "sprinkling" seems inadequate to express the volume of water actually used. "Dousing" with water would appear more appropriate. J. J. Forbes tells us in this issue that in Dolomite ten men were employed solely in keeping down coal dust. He assures us that the work of these men saved many lives, and we can well believe him.

Nevertheless, the Dolomite disaster was a coal-dust explosion, and it would appear that the sprinkling that was so efficient to the inbye of the main parting could not have been so effectual outbye from that point and possibly in the parting itself. It appears that runaway cars had raised a heavy dust on other occasions, and so it was undoubtedly present at least most of the time. No evil result had followed from this dust, and doubtless none was anticipated. No shot was likely to be placed at this point, consequently none could blow out, and the dust of coal is not readily fired unless the flame is part of the gust by which the dust is raised. If it were not so, probably many a tipple would long ago have been demolished by an explosion, for the air in such places always is charged heavily with dust.

Unfortunately there was always the possibility of a short-circuit either of the trolley wire or of the high-potential feeder. So when the opportunity came the dust was there and the explosion occurred. It is certain that the accident would not have happened had the feeder been trenched and covered by a plank, as are the high-voltage feeders in the Valier mine of Illinois. Furthermore, there were the trolley wires always ready to act in the same rôle as the offending feeder line, should the cars travel so far before piling up.

For this reason it is necessary to call attention to the danger of the mine entrance. It was at this point that the Monongah explosion started, killing 361 men. Here it was the trolley wire that made the short-circuit. Again in the Starkville mine of Colorado it was not far from the mouth of the mine that the explosion started, and it was a wrecked trip of cars that was the initiating cause. The explosion traveled several miles into the interior of the mine, and all the men—there were 56 of them—who were at work were killed.

So much attention has been given to the dangers of the live workings that those of the entrance of the mine have been overlooked. Yet in the mines of northern climes this is the one point which, in many cases, may not be properly safeguarded. If well sprinkled with water it will soon be rendered impassible because of the formation of ice. Here all the air receives its first warming, and here it is most greedy for moisture. Consequently this is the point where rock dust is greatly needed.

We cannot doubt that the European practice of "stone dusting" or rock dusting, as we term it, is the safest method, especially where the cars are not allowed to leak or spill coal. It is said that a company in the Middle West long ago lost faith in sprinkling and is a strong advocate of rock-dust barriers. Undoubtedly traps like these are good, but a general dusting everywhere is even better, and the use of both is better yet.

Obviously neither the Dolomite nor the Dawson workings constitute a safe mine, for contingencies might arise and have arisen in them causing explosions. The large sums expended, the rigorous inspections, the elaborate system of prevention, the intelligence of the management, were alike admirable but ineffectual. Let us hope there is something better. Let us trust that where the company has the personal integrity of the Woodward Iron Co. and the Phelps Dodge Corporation they can make their mines foolproof and rascal-proof. But that can be done only by pursuing some other method than that now adopted.

At the Dawson mine there has been one accident already from a blownout shot, and the recent disaster possibly may prove to have had a similar origin. It is true that when the company's rules have been followed there is no danger that an explosion will result from the firing of shots. It is clear that in such a climate as New Mexico a mine that is free from explosions of any kind for years and never has had them when shooting coal according to rule must have a good schedule of operation and must have a splendid body of shotfirers to carry it out.

Where explosives are allowed to come into a camp, however, they may be stolen. That may occur either before or after their distribution, and if a single man can steal a single cartridge and fire a single unauthorized shot and that shot will explode the mine, the system, though admirably conceived and carefully carried out by all the personnel but that one man, is a failure, and some means should be taken, if possible, to correct it.

It must be remembered that the greater the crime of firing an unauthorized shot the more likely it is to be a menace to everyone in the mine when it does occur. No man violating a law so needful to be enforced, the punishment of which, if detected, is so sure, will take the time and use the patience to make the shot safe. He in all probability will tamp it with coal dust as the material most readily at hand.

It is extremely difficult to wet coal or any other dust through and through. The top may be wet and the bottom still dry. The dust also will float unwetted on the water. Forceful spraying is necessary and not always successful. For this reason the use of rock dust is the safer remedy and should have had greater acceptance long ago.

This country invented the rock-dust spraying machine. Let it not be the last country to put it in continuous operation. Since Great Britain and France have compelled the use of rock dust and required the inspectors to ascertain, by sampling, the dusts on the mine floor, conditions have much improved. If the rule is not everywhere needed, as in the anthracite region, it surely is indicated in sections where the conditions are arid, where the hygrometer shows the percentage of moisture present in the air to be unduly low and where accidents like those at Dawson and Dolomite prove that the danger is unusually imminent.

WHAT THE COUNTRY NEEDS is more railroading and less railriding.—*Norfolk Virginian-Pilot.*

ON THE OTHER HAND, if it is going to be impossible to get coal there is still a lot of discarded political timber available.—*Detroit News.*

How Greater Depth and Reduced Thickness of Coal Have Intensified Lackawanna Mine Problems

Coal Is 71 Per Cent as Thick and 17 Per Cent Deeper Than Fifty Years Ago—Depth and Thickness by Five-Year Periods—Increased Use of Power Raises Output per Mule

BY DEVER C. ASHMEAD*
Kingston, Pa.

IN LACKAWANNA COUNTY, Pennsylvania, the average depth at which anthracite is mined increased from 229 ft. in 1872 to 268 ft. in 1922. The average thickness of bed mined, 6.83 ft. in 1872, in 1922 was but 4.88 ft. That hard-coal mining is getting deeper each year and that the thicker beds are being mined out has been a matter of common knowledge for years. This study, it is believed, is the first attempt to set forth these important facts in a quantitative manner. The results of this investigation, representing a year's collection and study of all available data, are not startling to those familiar with the hard-coal regions of Pennsylvania but they are illuminating to those who have wondered why the cost of their household fuel has been mounting year after year.

PROSPECT OF FUTURE EVEN LESS ASSURING

That the cream of the anthracite deposits has been removed and that from now on we must depend on an output from deeper and thinner beds, costing each year more and more in man power for its production, means only that the cost will continue to mount and that the total output cannot in any considerable degree pass that of recent years.

Conditions vary from district to district in the anthracite area and the results of this study will be presented in a series, the first covering the Lackawanna district, embracing the mines in Lackawanna County, Susquehanna County and Wayne County. At the conclusion of the articles on the several fields the data will be summarized for the whole region, with a forecast on costs in the immediate future.

The writer desires to express his thanks to R. V. Norris, consulting mining engineer, of Wilkes-Barre, for his advice and assistance in the preparation of this series of articles. To the Department of Mines of the State of Pennsylvania particular credit is due for the collection of data on depth and thickness, obtained by the mine inspectors from the various coal companies at the request of the writer. Thanks also are tendered to the office force of the Department of mines at Harrisburg for their aid in compiling statistics not published in their annual reports.

The representative character of the statistics on which this study is based is indicated by the following table and diagram (Fig. 1) showing against the total operation in the district the number of plants from which figures were obtained. In 1921-22 approximately 96 per cent of the companies reported on the depth and thickness of the beds. In 1902 about 95 per cent reported. In 1887 there were reports from about 61 per cent and 49 per cent reported in 1872. It was possible to use 85 per cent of the production statistics for 1921, 92 per cent for 1902 and 54 per cent for 1877.

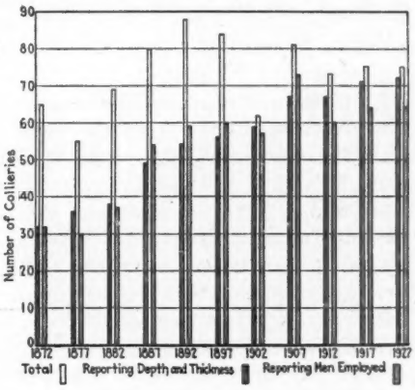


FIG. 1—NUMBER OF COLLIERIES IN LACKAWANNA COUNTY
This diagram shows the number of plants from which statistics on depth and thickness of coal mined were available by year and the number from which data was secured with respect to men employed, as compared with the total.

Washery coal and strippings have been excluded from the calculations wherever possible. Collieries known to sell locally likewise have been omitted. The geologic series in the Lackawanna district, as shown in Fig. 2, lies comparatively flat. The beds of coal are at shallow depths. The principal beds worked in the region are as follows, named from the surface down: Eight Foot, Five Foot, Four Foot, Diamond, Rock, Big Vein, New

*Assistant Editor, *Coal Age*.

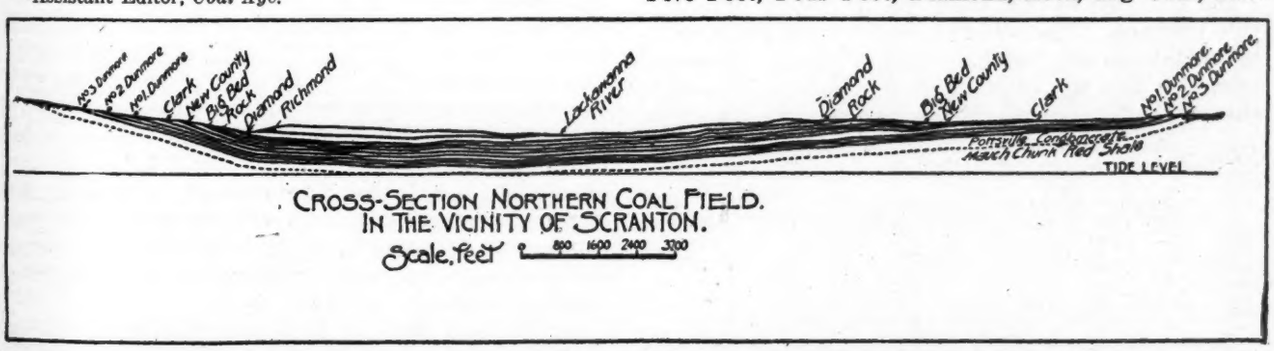


FIG. 2—SECTION OF THE LACKAWANNA DISTRICT IN THE VICINITY OF SCRANTON
This section of the coal measures shows the general flatness of the beds in this vicinity. It will be noted that the beds become slightly pitching as they approach the outcrop. Locally there are heavy rolls or faults. Even in the center of the basin the beds of coal are not flat but pitch heavily in small areas.

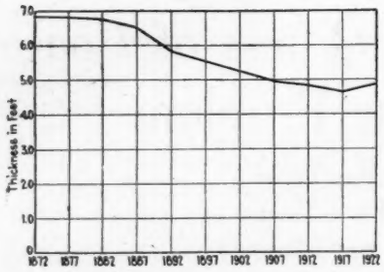


FIG. 3—AVERAGE THICKNESS OF COAL MINED AT FIVE-YEAR INTERVALS IN THE LACKAWANNA DISTRICT

The points on this curve were calculated from data obtained by the Department of Mines of the State of Pennsylvania from the various coal companies. A simple average thickness of coal was determined for each colliery, as there are no records of the output by beds. These simple average thicknesses were then multiplied by the production of the colliery and the results from all of the collieries were totaled. This total was divided by the total production of the collieries considered and the result plotted as weighted average thickness of the beds of coal in the Lackawanna district. This method was followed for each of the years shown.

County, Clarke, First Dunmore, Second Dunmore, Third Dunmore. In the vicinity of Forest City, at the northeastern end of the district, only the four lower beds are worked, but passing to the southwest to the Lackawanna-Luzerne County line the measures become deeper and here the higher beds are mined. From 1872, when the supply of anthracite was considered to be practically inexhaustible, the price was low and only the cream of the deposits were mined, and until 1882 there was no marked change in mining conditions. The average thickness of the beds mined in 1882 was 6.78 ft., compared with 6.83 ft. in 1872. From the early 80's on there was a steady depletion of the thicker beds and by 1917 the average thickness had decreased to 4.65 ft., or a drop of 31.8 per cent. The slight increase in thickness shown for 1922 over 1917 was due primarily to the opening of small outcrop strippings which could not be separated from the rest of the data.

Although the present average thickness is estimated at 4.88 ft., this does not tell the true tale. The coal that is now being obtained from the thicker beds is a continually decreasing percentage of the total output, as the work in these measures is now mainly second mining and in some cases third and fourth mining. In 1872 79.5 per cent of the coal was taken from beds thicker than the average for 1922. In 1872 only 20.5 per cent of the coal came from beds thinner than 5 ft., and of this 20.5 per cent, 14 per cent was from beds between 4 and 5 ft. in thickness and only 6.5 per cent from beds from 3 to 4 ft. thick.

Beds less than 3 ft. thick were first mined in 1887 and then represented only 1 per cent of the total. By 1922 25 per cent of the total was from beds thinner than 3 ft.

Fig. 3 shows that from 1897 to 1917 there were one or two beds being mined whose thickness averaged between 1 and 2 ft., but in 1922 there was no mining in beds of this thickness. These beds probably were found to be unprofitable or else they have been exhausted. However, even now in a few cases mining is being done in beds thinner than 2 ft., but only for very small local areas in

TABLE I—NUMBER OF COLLIERIES IN LACKAWANNA COUNTY

	Total As Reported by the Department of Mines	Having Depth and Thickness, Data	Having Tonnage Data
1872.....	65	32	32
1877.....	55	36	30
1882.....	69	38	37
1887.....	80	49	54
1892.....	88	54	59
1897.....	84	56	60
1902.....	62	59	57
1907.....	81	67	73
1912.....	73	67	60
1917.....	75	71	64
1921–2...	75	72	64

TABLE II—AVERAGE DEPTH AND THICKNESS OF COAL MINED IN THE LACKAWANNA DISTRICT, IN FEET

Years	Average Depth of Workings	Average Thickness Of Beds	Years	Average Depth of Workings	Average Thickness Of Beds
1872.....	229	6.83	1902.....	276	5.28
1877.....	240	6.83	1907.....	275	4.94
1882.....	265	6.78	1912.....	278	4.84
1887.....	254	6.53	1917.....	266	4.65
1892.....	264	5.88	1922.....	268	4.88
1897.....	281	5.55			

a bed which averages a greater thickness. Sometimes it is necessary to remove this coal to get at the thicker coal in the same bed. It is clear from this record that the thicker beds are being worked out and that the production of coal in the Lackawanna district may be kept up only by mining more extensively the thinner beds.

Because the beds of coal in the Lackawanna district lie practically flat there are no marked variations in the depths of the workings. In 1872 the average depth of workings was 229 ft. (Fig. 5) and in 1897 this depth reached the maximum of 281 ft. Since then the average depth has not varied more than 15 ft. This may be explained by the fact that the thinner beds of coal which have been opened up in more recent years are scattered through the measures at both shallow and deep levels.

Even though the average depth of workings has remained fairly constant since 1897, the maximum depth of workings has increased. Until 1892 there were no workings reported deeper than 600 ft., but since then the lowest workings have gone deeper and deeper. The maximum depth in 1897 was 800 ft.; in 1902 it was 900 ft. and in 1907, 1,000 ft., the record for the Lackawanna district. In the meantime there has been an increase in the percentage of workings that are less than 100 ft. in depth, for in 1922 about 19 per cent of the workings were within 100 ft. of the surface and this has counterbalanced the greater maximum depth and kept the general average constant. It is interesting to study the change in the thickness of the beds at various depths of workings. This is shown in Fig. 7. Here the average thickness of beds is shown for every 100 ft. change in the depth of the workings. The main feature brought out here is that quite generally throughout this district, irrespective of depth, the thickness of the beds worked has decreased since 1872 and that the average thickness of the beds in the different levels has remained relatively constant.

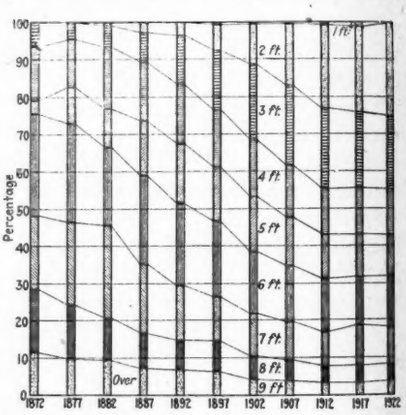


FIG. 4—PERCENTAGE DISTRIBUTION OF NUMBER OF BEDS WORKED BY THICKNESS IN THE LACKAWANNA DISTRICT

This diagram shows the percentage of the total number of beds of each thickness mined in each year. How, as the region has been developed, thinner and thinner coal beds have been opened up is clearly shown in this diagram. The information on which this diagram is based was furnished by the Pennsylvania State Department of Mines from data supplied by the mining companies.

In the early days of anthracite mining mechanical power was not used in the production of coal. It was not until about 1848 that the first steam engine was used, and it was installed in a breaker to drive the rolls

and the revolving screens of that day. There were a few hoisting and Cornish pumping engines used, but most of the mines were opened by tunnels or drifts, so that very little power was required. Even in the fifties comparatively little power was used and it was not until 1860 that steam power was greatly used about the mines. In 1872 although power was being used it had not reached its maximum, for many operations that are now done mechanically were then done by hand.

The increasing consumption of power required in the production of anthracite is shown in Fig. 8. Previous to 1897 there was little or no mechanical underground haulage with the exception of rope haulage. The power necessary to operate the breakers was small, for in 1877 the coal smaller than chestnut was left underground in some mines. The coal coming from the thicker beds was comparatively clean and was given but little preparation other than crushing and screening. The individual plants were small. Less power was required to hoist the coal to the surface from the shallower depths of those early days. There were fewer surface breaks and the surface water did not have access to the mines through the cave holes.

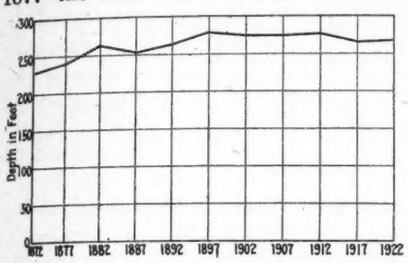


FIG. 5—DIAGRAM SHOWING THE INCREASING DEPTH AT WHICH ANTHRACITE HAS BEEN MINED IN THE LACKAWANNA DISTRICT FROM 1872 TO 1922

The data on which this diagram is based were supplied by the mining companies at the request of the Department of Mines of the State of Pennsylvania. Reports were made showing the maximum depth of workings on each bed in each mine at five-year intervals from 1872 to date. The simple average depth of workings as thus reported was first determined for each colliery. The average of all was determined by weighing each by the production of that colliery as shown by the records of the Pennsylvania State Department of Mines. It was impossible to obtain a true weighted average depth of workings because records of production by beds are not available save for recent years. The Lackawanna district does not show the increase in depth of workings that is found in other regions to the south. From 229 ft. in 1872 to around 270 ft. in the past thirty years is but a small increase.

For the years 1877 to 1897 inclusive it was possible to produce more than 1.5 tons of coal for every boiler horsepower installed, and a trifle under 1.5 tons of coal for each engine horsepower installed. Since then, however, the amount of coal produced per boiler horsepower and engine horsepower installed has uniformly decreased and in 1917 there was produced only 0.82 ton of coal per boiler horsepower and 0.62 ton per engine horsepower.

The increasing use of fuel coal per ton of production follows from a number of factors. It may be expected to increase in the future.

The proportion of total output raised through single shafts is increasing, and therefore larger and quicker operating hoists are required. Mechanical haulage underground is gaining, requiring more power. Greater quantities of water are being raised because the more extensive openings and the surface breakthroughs permit the entrance of the surface water into the mines. At some mines the amount of water that has to be handled is stupendous, reaching at one colliery about 90 tons to each ton of coal shipped.

The mining of thinner beds, many of which are dirty; waste material from shooting down the roof or taking up the bottom to provide sufficient headroom and the working of beds which contain heavy partings formerly considered worthless are all factors requiring more careful preparation of the coal so that it can be marketed. This additional preparation calls for more power. The tendency of all these factors is in the direction of greater and greater power requirements in the mining and preparation of anthracite.

TABLE III—POWER USED IN PRODUCTION OF ANTHRACITE IN THE LACKAWANNA DISTRICT

Years	Boiler Horsepower Installed	Engine Horsepower Installed	Tons of Coal Hauled per Mule	Tons of Coal Produced per Boiler Horsepower	Tons of Coal Produced per Engine Horsepower	Number of Underground Locomotives per 100,000 Tons of Annual Production
1877.....	13,860	13,931	18.0	1.77	1.76	....
1882.....	17,610	18,746	12.7	1.51	1.42	....
1887.....	25,770	27,897	14.9	1.58	1.46	....
1892.....	33,000	25,443	17.3	1.74	2.10	....
1897.....	50,000	.....	21.8	1.72	.....	....
1902.....	56,435	68,464	19.6	1.38	1.14	0.19
1907.....	91,560	98,864	21.8	1.06	0.99	0.74
1912.....	106,684	112,977	24.4	0.84	0.80	1.37
1917.....	86,417	114,186	27.6	0.82	0.62	2.18

It is doubted whether the length of underground haul in the anthracite mines has materially increased in the past fifteen years. It is probable that the length of haul increased materially from 1872 to 1882. The length of haul appears to have reached a maximum in 1882, for the tons of coal hauled per mule per day were the least in 1882. From 1882 to 1897 the amount of coal hauled per mule per day increased with shorter haul. From the time (1897) when the underground mine locomotive first began to take on a share of the haulage work, the use of the mule fell off.

The mounting curve of number of underground locomotives considered with the increased tonnage per mule per day brings out the fact that when motors are installed the mule's travels are shortened and more tons are handled each day per animal.

The first serious subsidence of the surface in the anthracite region was reported in 1865 at Stockton, in the Eastern Middle field. A home and a family of five

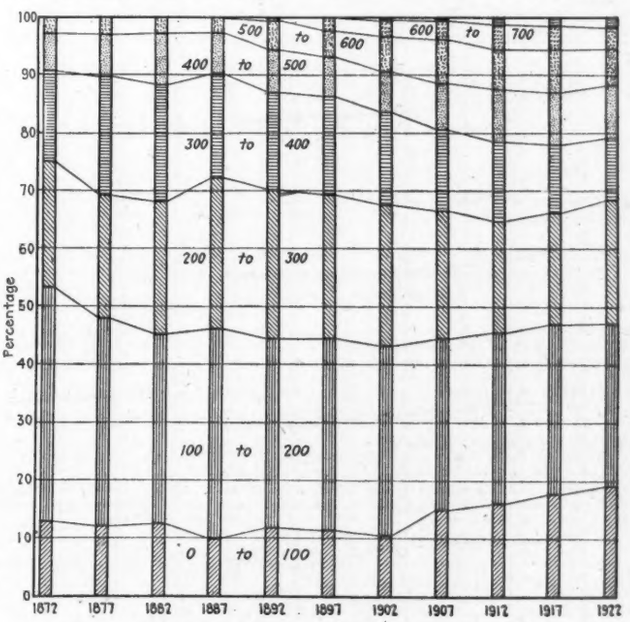


FIG. 6—PERCENTAGE OF BEDS AT EACH 100-FT. INTERVAL OF DEPTH

This curve shows the percentage of beds being worked at each 100-ft. level. The maximum depth only is shown. A bed may be worked at a maximum depth of 500 ft. and be worked at each 100-ft. level upward to the surface, but is here recorded at the maximum depth. The numbers of beds worked each year and at each 100-ft. interval in depth were counted and the percentages to the total plotted on this curve.

were engulfed and their bodies were never recovered. Almost yearly since then more and more support of the surface is removed and there are numerous cases of settlement. This is particularly true of the Lackawanna district, where the beds are closer to the surface than they are elsewhere in the region. The City of Scranton itself has suffered greatly in this respect. Subsidence must be guarded against in built-up areas or if not guarded against then the property so damaged usually is restored. In either case money must be expended and the cost of production increased.

Man power is indispensable in mining coal. Men are required to direct machines and machinery and to do work that can be done only by hand. Many of the labor-saving devices used in other kinds of mining cannot be used in anthracite operations. This is largely because of the character and attitude of the coal beds. The efficiency of the man power determines to a large extent the cost of mining coal. If in the whole region it is found that the efficiency of the men is decreasing it is interesting to seek the explanation.

Production of Coal Per Total Employee

In Fig. 10 three sets of curves are shown. The lower one shows the average output of coal per day for all men employed as calculated from the mine inspectors' reports. A small loss in average daily output, all employees considered, is indicated from 1872 to the later dates. This is in face of the fact that new and improved types of machinery have been developed, reducing the man power required to do the work.

The decrease in output per man employed is greater, however, than is shown by the solid line on Fig. 10. In the earlier years the small sizes of coal were not sold or shipped and were not recorded as production. That is, the divisor in calculating average tons per man was too small. Corrections in the figures that take into account the total output in the earlier years give the dash-line curve in Fig. 10. This indicates a fairly regular decrease in the average output per man, from a maximum of 2.84 tons per day in 1877 to 1.74 tons per day in 1921, a decrease of approximately 39 per cent.

TABLE IV—MULES AND LOCOMOTIVES IN MINES IN THE LACKAWANNA DISTRICT

	Mules In Service	Inside Locomotives		Mules in Service	Inside Locomotives
1877.....	1,361	...	1902.....	3,976	45
1882.....	2,089	...	1907.....	4,472	217
1887.....	2,727	...	1912.....	3,862	369
1892.....	3,321	...	1917.....	2,566	466
1897.....	3,950	...			

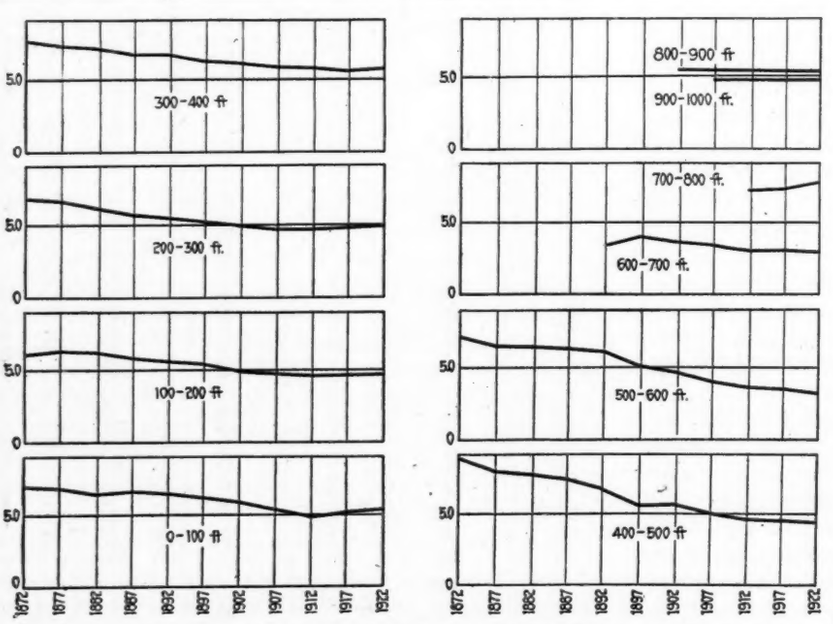


FIG. 7—AVERAGE THICKNESS OF BEDS AT EACH 100-FT. INTERVAL IN THE LACKAWANNA DISTRICT, 1872 TO 1922

The points on these curves were calculated from data furnished by the various mining companies to the State Department of Mines. The figures are unweighted averages as there are no records over this period covering the tonnage of coal produced from each bed.

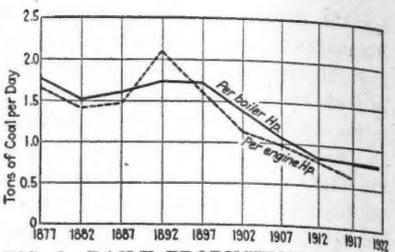


FIG. 8—DAILY PRODUCTION OF COAL PER BOILER HORSEPOWER AND ENGINE HORSEPOWER INSTALLED, 1877-1921

The points in these curves were obtained by dividing the tons of coal produced at the collieries under consideration by the weighted number of days worked in the Lackawanna district and then dividing the result by the boiler and engine horsepower installed. This gives the amount of coal produced per day per boiler and engine horsepower installed. The original figures for these calculations were obtained from the reports of the mine inspectors to the Pennsylvania State Department of Mines. In the earlier years no figures of boiler horsepower were recorded but from the details of the size of the boilers the capacity was calculated.

A further correction is necessary. There have been two changes in the length of the standard day. From 1877 to 1902 the day was 10 hours, and from 1902 to 1916 it was 9 hours. Since 1916 it has been 8 hours. Seemingly, therefore, the dash-line curve should be corrected by reducing the figures by 20 per cent for the years 1877 to 1902, and by 11 per cent from 1902 to 1916 to bring all records to the comparable basis of 8 hours per day. However, from information in old reports and from conversations with superintendents of the earlier years, the writer concludes that the miners never worked longer hours than they do at the present time, particularly the contract miners. These corrections are made, therefore, only with respect to day men. The final corrected figure is 2.55 tons of coal per man per day in 1877 as against 1.74 tons in 1921, a decrease in average daily production of 0.79 ton of coal per man employed, or 31.2 per cent.

The second set of curves in Fig. 10 shows the average daily output per inside employee. The heavy line shows, as calculated from the mine inspectors' reports, an output in 1877 of 2.95 tons compared with 2.32 tons in 1921, a decrease of 0.63 ton per man per day, or 24.8 per cent. Corrected for the smaller sizes not shipped in the earlier years, the figure for 1877 is 4.33 tons per man per day, some two tons, or 46.4 per cent, above 1921.

From 1902 on there is little variation in the average daily outputs for inside employees. There is some evidence that these daily averages went up in 1917 and 1918. Figures from the records of a few companies employing about 4,000 miners show that these men worked on an average of about 0.4 hour more during the war period than they did in 1919. This reported working time for the year 1918 at these few mines was 7.5

hours at the face and in 1919, 7.1 hours at the face. Taking this into consideration, the curve, even during the latter period, shows a decided decrease in the tons of coal produced per day per inside employee.

The third and last set of curves in Fig. 10 shows the average daily output of outside employee. The showing here is controlled by the changes in breaker employees. During the early period there was comparatively little machinery used in the breakers, as the coal was clean and required a minimum of preparation other than that given by the breaker boys. There were many men and boys assigned to this hand preparation, which reduced the average daily output of outside employees. From 1872 to 1877 for the first time the average output decreased. During the late seventies jigs were introduced in this region, and gradually the slate pickers decreased and the tonnage per man increased. Gradually the capacity of the breaker machinery was increased and as it increased the output expanded. No more men were required to man the breakers with larger capacities than were required to operate the older and smaller ones. With the introduction of conveyor lines and the more extensive use of steam locomotives and other mechanical devices for moving the coal below and on the surface there has been some decrease in the number of men required. As against this it is probable that a few more surface men are now required to handle and prepare timber to support the continually increasing areas of new mining opened underground.

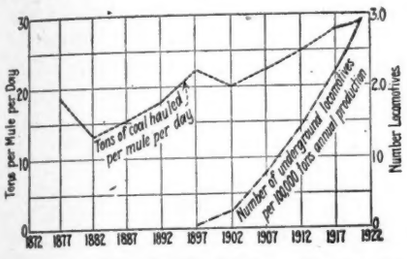

Tons per Mule per Day
Number Locomotives
Tons of coal hauled per mule per day
Number of underground locomotives per 100,000 tons annual production
1872 1877 1882 1887 1892 1897 1902 1907 1912 1917 1922

FIG. 9—AVERAGE DAILY TONNAGE HAULED PER MULE AND NUMBER OF UNDERGROUND LOCOMOTIVES PER 100,000 TONS OF ANNUAL PRODUCTION, IN THE LACKAWANNA DISTRICT

These figures were calculated from the reports of the district mine inspectors of the Department of Mines of Pennsylvania. In determining the tons of coal hauled per mule per day, the total production was divided by the weighted number of days worked in the Lackawanna district and then by the number of mules at the corresponding collieries. The number of locomotives per 100,000 tons of coal produced was determined by dividing the number of tons of coal produced by the weighted number of days worked for the district, multiplying the result by 300 (as a full working year) to bring the figures to a common base. This result was divided into the number of locomotives used in the district, and by pointing off properly the result is the number of locomotives per 100,000 tons of coal produced. It will be noted that the figure for 1897 of tons of coal per mule per day is extremely high. This is due, it is believed, to errors in the inspectors' reports for that year. This divergence will be noted in many of the curves for the year 1897.

The increase in power required has meant in some cases an increase in the force used in producing power, but as against this the mechanical stokers have cut the force. Then again other companies have ceased producing their own power wholly or in part. The introduction of electric machinery has added electricians to the outside forces.

Again noting the data shown in Fig. 10 it is seen that in 1877 the average daily output per outside employee was 5.73 tons compared with 5.01 tons in 1882 and 8.03 tons in 1921, an increase of 3.02 tons, or about 60 per cent in 44 years. Corrected for the small sizes, the figures become 8.40 tons in 1877, 6.84 tons in 1882, and 8.03 tons in 1921. The correction here is for the full difference in the hours worked, as the men are mostly day men and although there are many monthly men employed there are no contract men. Therefore the cor-

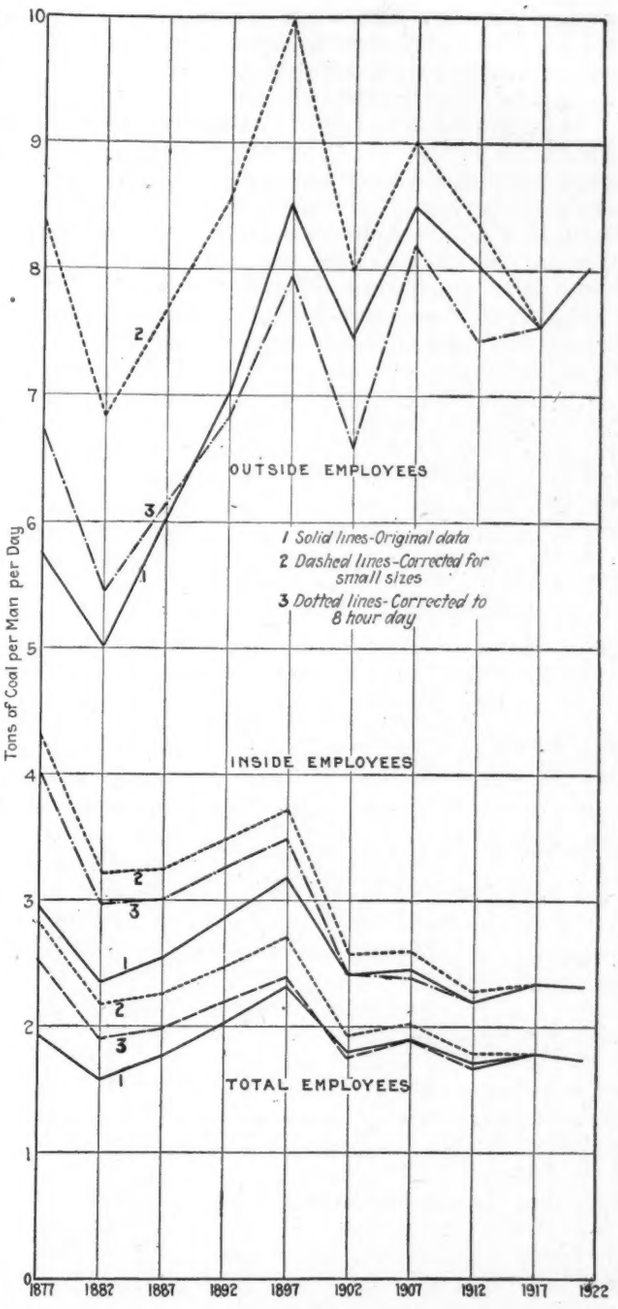

Tons of Coal per Man per Day
OUTSIDE EMPLOYEES
1 Solid lines-Original data
2 Dashed lines-Corrected for small sizes
3 Dotted lines-Corrected to 8 hour day
INSIDE EMPLOYEES
TOTAL EMPLOYEES
1877 1882 1887 1892 1897 1902 1907 1912 1917 1922

FIG. 10—AVERAGE DAILY PRODUCTION OF COAL PER EMPLOYEE IN THE LACKAWANNA DISTRICT, 1872-1921

The figures are shown as calculated from the reports of the state mine inspectors, also with corrections for small sizes of coal not reported as production in the earlier days, and finally to a uniform 8-hour day. The solid lines represent the figures as calculated from the original data taken from the reports of the mine inspectors in the anthracite region of the Department of Mines of the State of Pennsylvania. The days worked were determined by multiplying the number of employees by the number of breaker days at each colliery. Then the total number of employees in the district was divided into the sum of the men-days at each colliery and the result considered the weighted average number of days worked. The next step was to divide the total number of employees into the total production of the collieries to determine the average annual output per employee. This, divided by the weighted number of days worked, gave the average daily output per employee.

The dash line shows the correction for small sizes. It was impossible to obtain exact tonnages of small sizes of fresh mined coal shipped in these earlier years but from information in the reports of the Girard Estate and in the Coal Trade Annual estimates were made. For later years the actual figures are given by the U. S. Geological Survey. These estimates are: 1872, sizes under chestnut shipped, 8.8 per cent; 1877, 16 per cent; 1882, 26.8 per cent; 1887, 30 per cent; 1892, 42 per cent; 1897, 57 per cent; 1902 82.7 per cent; 1907, 84.6 per cent; 1912, 90.3 per cent. Knowing the true percentages of small sizes produced, the corrections were made by difference from these estimates. As no washery coal is considered in these figures the percentage of small sizes from washeries was not taken into consideration.

rection is heavier than where the inside men are considered. The final corrected curve shows for 1877 an average daily output of 6.72 tons for outside men against 5.47 tons in 1882 and 8.03 tons in 1921.

Thus, although from 1877 to 1921 the average daily output for outside men increased, the increase has not been sufficient to counterbalance the loss in average daily production per inside employee, and the average daily production for all employees shows a decided decrease.

Until 1902 the mines operated ten hours a day, from Oct., 1902, to 1916 they operated nine hours a day and from 1916 to date the standard day has been eight hours. To reduce the figures of average daily output to a comparable basis it was necessary to correct for the differences in the length of day worked. The figures during the 10-hour day period were reduced by 20 per cent; for 1902 they were reduced 17.3 per cent, as the mines worked 10 hours for a few months at the beginning of the year and 9 hours at the end, and during the 9-hour day period the figures were reduced by 11 per cent. To allow for the fact, irrespective of the hours of the day men the time actually worked by the miners has always been about 8 hours, a further correction was necessary. The miners represent about 50 per cent of the total force and correction was made accordingly. It will be noted that the year 1897 is out of line with the others. This is believed to be due to errors in the mine inspectors' reports for that year. The diagram also shows these

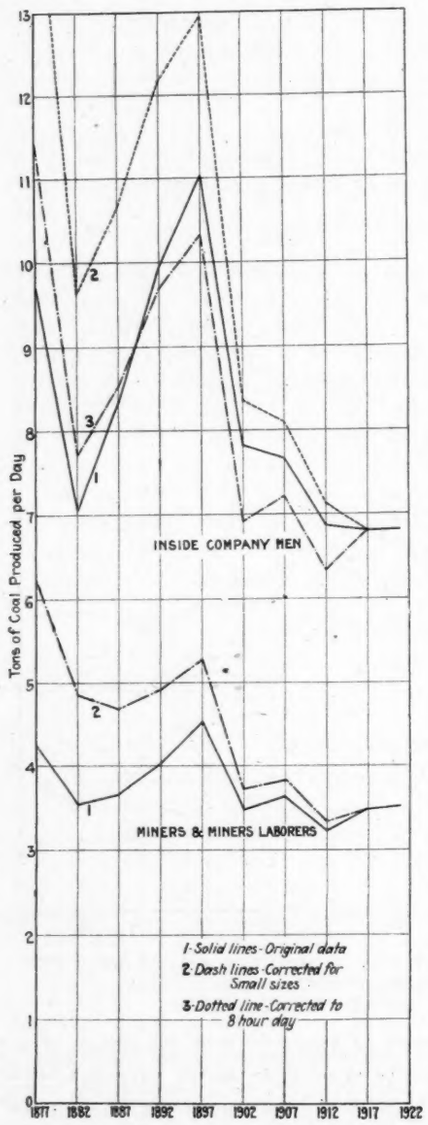


FIG. 11—AVERAGE DAILY PRODUCTION FOR INSIDE EMPLOYEES IN THE LACKAWANNA DISTRICT, 1872-1921

The figures are shown as calculated from the reports of the state mine inspectors, also with corrections for small sizes of coal not reported as production in the earlier days and finally to a uniform 8-hour day. In the calculation of these curves the same method was used as in calculating the curves for the number of tons of coal produced per day per total man employed. No correction was applied for hours worked for the miners, as they worked the same time under all conditions. It is again necessary to call attention to the fact that the points for the year 1897 are too high and should be neglected and that the average for the years 1892 and 1902 is considered to more nearly represent the facts.

TABLE V—MEN EMPLOYED IN PRODUCTION OF ANTHRACITES IN THE LACKAWANNA DISTRICT

	Total Employees	Inside Employees	Outside Employees	Miners and Miners' Laborers	Company Men
1872	9,655	6,744	2,911	4,818	1,926
1877	9,553	6,305	3,248	4,394	1,911
1882	13,084	8,892	4,192	5,910	2,982
1887	22,944	16,122	6,822	11,146	4,976
1892	25,649	18,212	7,437	12,930	3,321
1897	31,661	23,015	8,646	16,332	6,683
1902	30,941	23,379	7,562	16,177	7,202
1907	39,413	30,563	8,850	20,715	9,848
1912	42,859	33,385	9,105	22,705	10,680
1917	37,885	28,895	8,990	18,905	9,990
1921	34,644	26,888	7,756	17,748	9,140

data, original and with the same corrections for inside employees.

Before considering the curve in Fig. 11, which shows a fairly uniform decrease in the daily output of underground men, let us see what has happened in the Lackawanna district that will throw light on this condition. The average thickness of the beds mined has been decreasing. Working thinner beds means that more cuts must be made across the face of the room or gangway and more holes must be drilled for a given output. The coal must be handled in cramped positions. Each of these conditions tends to reduce the daily output of the miner. In the thinner beds the top rock must be taken down or the bottom lifted to admit the mine cars. This deadwork reduces the productive work time of the miner.

In the mining of dirty beds the miners are required to devote a part of their time to the removal of the refuse underground. During the earlier days of mining the beds were practically clean and the time lost in the removal of refuse was negligible.

Another factor reducing the daily output of miners in some beds is supporting bad roof. Bad roof there always has been, but where the coal was thick in the old days 2 to 4 ft. was left for roof support. Coal is too valuable now to be left for this purpose. Setting timbers takes time and reduces the productive work time of the mine worker.

There are improvements in practice, however, that operate in the other direction. Machinery has been introduced, enabling the miner to get out more coal under the same conditions. In the Lackawanna district the beds of coal are flat and mining machines are extensively used in many of the mines for undercutting the coal. Scraper loaders are used in thin beds at many of the collieries, eliminating the hand loading into mine cars.

In the early period of mining the shotholes were drilled by hand, but now the jackhammer and similar types of drills are becoming common. Power drills reduce the labor of drilling and give the miner more time for loading coal and doing other work. Carbide and portable electric lamps have replaced the oil lamp. The miner has better light in which to work, without the smoke from the open flare. Good lighting is an important help to the underground worker.

Setting the increased difficulties in mining against the improvements in methods and machinery, it is interest-

TABLE VI—PRODUCTION AND DAYS WORKED AT ANTHRACITE MINES IN THE LACKAWANNA DISTRICT

	Production In Gross Tons	Average Days Worked		Production In Gross Tons	Average Days Worked
1872	4,886,618	...	1902	8,215,592	141
1877	2,688,120	145	1907	17,360,165	231
1882	4,728,397	226	1912	16,520,299	224
1887	9,278,548	228	1917	19,251,863	283
1892	10,746,036	206	1922	17,334,459	267
1897	10,887,372	148			

TABLE VII—AVERAGE DAILY PRODUCTION OF ANTHRACITE PER EMPLOYEE, LACKAWANNA DISTRICT IN GROSS TONS

	Per Total Employee			Per Inside Employee			Per Outside Employee		
Years	Reported	Corrected for Small Sizes	Corrected to 8-Hr. Day	Reported	Corrected for Small Sizes	Corrected to 8-Hp. Day	Reported	Corrected for Small Sizes	Corrected to 8-Hr. Day
1877	1.94	2.84	2.55	2.95	4.33	4.03	5.73	8.40	6.72
1882	1.60	2.18	1.92	2.36	3.23	2.98	5.06	6.84	5.47
1887	1.77	2.26	1.98	2.55	3.25	3.02	6.06	7.71	6.16
1892	2.03	2.48	2.20	2.87	3.50	3.26	7.03	8.56	6.84
1897	2.32	2.71	2.38	3.20	3.71	3.49	8.52	9.97	7.97
1902	1.81	1.94	1.76	2.41	2.58	2.43	7.45	7.97	6.59
1907	1.91	2.03	1.91	2.46	2.61	2.41	8.49	9.01	8.20
1912	1.71	1.78	1.68	2.20	2.29	2.20	8.05	8.36	7.45
1917	1.79	1.79	1.79	2.35	2.35	2.35	7.55	7.55	7.55
1921	1.74	1.74	1.74	2.32	2.32	2.32	8.03	8.03	8.03

ing to see what has actually resulted. In Fig. 11 the lower set of curves shows the production per miner and miner's laborer per day. The solid line shows the figures calculated from the mine inspectors' reports. In 1877 the output per miner and miner's laborer was 6.21 tons per day while in 1921 it was 3,51, a decrease of 2.71 tons, or 43.7 per cent. If the 1897 result is considered valueless, as is explained in the footnote to Fig. 10, and the average of 1892 and 1902 is considered the proper figure, then the dash curve shows a fairly uniform decrease in the amount of coal produced per miner and miner's laborer per day.

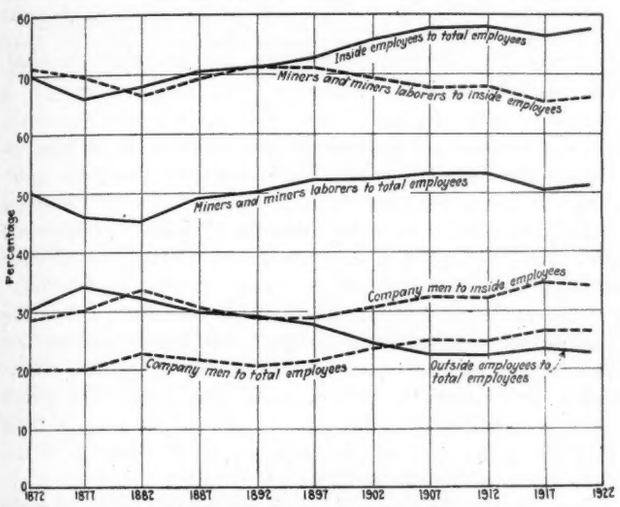


FIG. 12—PERCENTAGES OF EMPLOYEES BY CLASSES IN THE LACKAWANNA DISTRICT

From the annual reports of the mine inspectors of the Department of Mines of Pennsylvania.

TABLE VIII—PERCENTAGE OF GIVEN CLASSES OF EMPLOYEES TO TOTAL EMPLOYED

Years	Inside Employees	Outside Employees	Miners and Miners' Laborers	Miners and Miners' Laborers (a)	Company Men	Company Men (a)
1872	69.9	30.1	50.0	71.2	20.0	28.6
1877	66.0	34.0	46.0	69.8	20.0	30.2
1882	68.0	32.0	45.0	66.5	22.8	33.5
1887	70.3	29.7	49.0	69.1	21.7	30.9
1892	71.0	29.0	50.0	71.2	20.4	28.8
1897	72.6	27.4	52.0	71.0	21.1	29.0
1902	75.6	24.5	52.0	69.3	23.3	30.7
1907	77.6	22.4	53.0	67.8	25.0	32.2
1912	77.9	22.1	53.0	68.0	24.9	32.0
1917	76.4	23.2	50.0	65.4	26.4	34.6
1921	77.6	22.4	51.0	66.0	26.4	34.0

(a) Percentage to inside employees.

TABLE IX—AVERAGE DAILY PRODUCTION OF INSIDE MEN

	Miners and Miners' Laborers		Inside Company Men		
Years	Reported	Corrected for Small Sizes	Reported	Corrected for Small Sizes	Corrected to 8-Hour Day
1877	4.23	6.21	9.73	14.26	11.40
1882	3.55	4.85	7.04	9.62	7.70
1887	3.67	4.69	8.32	10.64	8.50
1892	4.03	4.91	9.97	12.16	9.72
1897	4.51	5.27	11.02	12.90	10.31
1902	3.48	3.74	7.82	8.36	6.91
1907	3.63	3.84	7.63	8.10	7.21
1912	3.73	3.35	6.86	7.13	6.35
1917	3.59	3.59	6.80	6.80	6.80
1921	3.51	3.51	6.81	6.81	6.81

As has been previously explained, the figure for the miner's daily output should not be corrected for hours worked. However, in the earlier years the miner's laborer did not quit work with the miner and it may be possible that some correction should be made for this condition. It is not believed that such correction would affect the final result for in those days the number of miners' laborers was proportionately less than today. Furthermore, since the miners never did average 8 hours work per day, this would doubtless counterbalance the longer hours of their laborers.

The data for the earlier years on company employees probably is not as complete as it might be, but from 1882 on the figures are considered fairly good. The corrected figures for company employees (Fig. 11) from 1882 to 1892 show a gain in average daily output and from 1892 to 1921 they record a continuous decrease.

Why the greater output per man in the earlier period? During the earlier period the price of coal was extremely low and it is surmised that the companies forced to economize in some manner kept the number of company men at the lowest possible level. This increased the average daily output per man.

Motor haulage in this district began in 1895 and has continually increased, but there is shown no corresponding decrease in the number of men employed.

Electric Furnace for Determination of Coal-Ash Fusion Temperatures

By Osborn Monnett* and Jerome F. Kohout*

EXPERIENCE has proved the value of the electric furnace illustrated herewith for determining the temperature at which coal ash will fuse. It is of simple construction and economical in operation, and the fusing temperature of coal ash can be more quickly and easily found than in a gas furnace, which we regarded as undesirable because it was noisy in operation and too hot for the convenience of the operator and, furthermore, because temperatures approaching 3,000 deg. F. could not be attained without the introduction to the burners of auxiliary oxygen and because the atmosphere in the heated zone could not be regulated simply and positively.

Of prime importance is the character of the atmosphere in which the fusing takes place. The consensus of opinion at the present time is that the atmosphere should be such as will favor a minimum fusing temperature of the ash cone. With this form of electric furnace the proper atmosphere to ascertain that temperature can be introduced and kept under control.

The furnace we required was one in which the fusing would be done in a tube of about 1-in. bore. With the exception of the Hoskins tube furnace practically all the gas and electric furnaces on the market were of the crucible or vertical type or modifications of that construction. The Hoskins furnace, however, requires for its operation an alternating current of low voltage and high amperage. In consequence a transformer has to be used to provide current of the correct potential. We were limited to direct current of 110 or 220 volts and could not use over 35 amperes, owing to the restrictions imposed on those using the lighting circuit in the "Loop district" of Chicago.

The furnace as finally built consists of two refractory

*Commercial Testing & Engineering Co., Chicago, Ill.

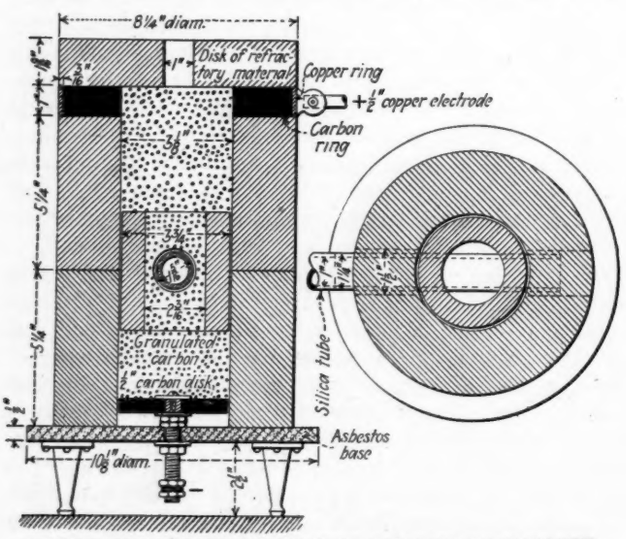
cylinders, each 6 in. high, 8¼-in. outside and 3⅞-in. inside diameter, set on end, and one on the other. These form the outside of the jacket. The cylinders each have 1½-in. semicircular grooves made radially on one of their ends, on the bottom of the one and on the top of the other, so that when they are set up on each other with the grooves adjacent the jacket will have through it a hole 1¼ in. in diameter. Within these outer cylinders is another hollow cylinder also about 6 in. high, of 3¾-in. outside and 2 5/16-in. inside diameter, placed so that it is 3 in. below the upper edge of the upper cylinder and an equal distance above the lower edge of the lower cylinder. This inner lining is pierced at its mid length with a hole 1¼ in. in diameter which is placed so as to line up with the hole in the outer jacket.

A fused silica tube 8 in. long, of 1-in. bore and ⅛-in. wall is placed in this opening and forms the muffle. The heat is generated around the silica tube and within the inner refractory cylinder.

The electrode at the bottom of the furnace consists of a graphite disk 3¾ in. in diameter and ½ in. thick, through the center of which passes a ½-in. copper rod. The electrode at the top is a graphite ring of 3⅞-in. inside and 7-in. outside diameter and 1 in. thick. Around it is placed a copper band fastened to a ½-in. copper rod. Coarse granular resistor material is placed on the lower electrode in the lower cylinder.

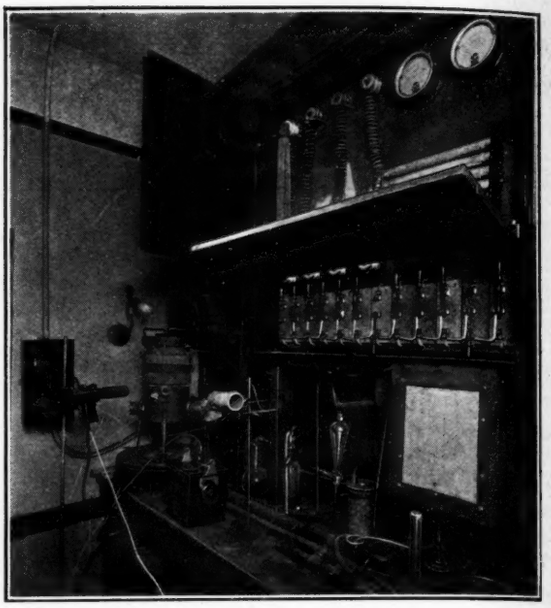
The inner cylinder, carrying the silica tube, is placed in position, and the space around the tube filled with resistor material which has been ground so that all of it passes a 20-mesh and 60 per cent passes a 40-mesh sieve. The upper cylinder and upper electrode are placed in position and the rest of the furnace filled with the coarse granular carbon. The electrodes are connected to the line, and some sort of outside resistance is employed to control the current input and hence the temperature. A switchboard is used carrying resistance coils suitably connected to single-pole double-throw switches, so that any part or all the resistance may be cut out or put into series with the furnace.

The atmosphere is introduced through a small-bore silica tube placed in line with the muffle tube, so that the inner end of the small tube is within the inner end



CROSS-SECTIONS OF 3,000-DEG. ELECTRIC FURNACE

Substantially it consists of a two-piece vertical refractory cylinder made of Corundite, with an inner cylinder of the same character. Through these cylinders at right angle to them passes a silica tube which serves as the muffle. The furnace is mounted on a Transite asbestos base. Granulated carbon carries the current from the upper to the lower terminal, heating the silica tube in its passage.



ELECTRIC FURNACE AND ITS ELECTRIC CONTROLS

On the left may be seen the pyrometer for gaging the temperature. The control box above the desk is opened to show the switches, resistances and meters. This furnace is being operated by direct current.

of the larger. Illuminating gas in a slow stream is passed through absorption oil to remove whatever light oil or other hydrocarbons are soluble in it. It is then passed through water to saturate it with water vapor and then through a silica tube filled with pieces of coke and heated red hot.

The purpose of this hot tube is to break down the remaining hydrocarbons so that the gases leaving the tube are principally carbon monoxide, hydrogen, water vapor and nitrogen with a little methane. The gases next pass through a bunsen burner to mix in a little air, the upper end of the chimney of the burner being connected to the silica tube.

An analysis of the atmosphere within the silica tube drawn from the hot zone with the furnace at about 2,500 deg F. is as follows:

Gas	Percentage	Gas	Percentage
Carbon dioxide	9.5	Carbon monoxide	11.4
Unsaturated hydrocarbon	0.0	Methane	0.0
Oxygen	0.4	Nitrogen	71.5
Hydrogen	7.2	Total	100.0

A series of ash-fusion determinations was made on four samples of coal ash in this furnace, and the same ashes were fused in the gas furnace of the U. S. Bureau of Mines in its laboratory at Pittsburgh, Pa. One sample was fused in the Chicago Laboratory at 2,215 deg. F. and in the Pittsburgh Laboratory at 2,060 deg. A second sample fused at 2,361 deg. and 2,320 deg. respectively. A third sample fused at 2,555 and 2,500 deg. and a fourth at 2,892 deg. and 2,900 deg.

It will be noticed that the agreement is close, particularly in view of the fact that an operator making two determinations of the same ash in the same furnace is regarded as having checked his first figure if he comes within 90 deg. of that figure in making the second determination. In this case two different operators determined the fusing temperature with two totally different types of furnace, and yet the greatest difference between their results was 155 deg. F. For making temperature measurements a Leeds & Northrup optical pyrometer is used.

High-Power Cable Cut by Cars That Were Uncoupled In a Rotary Dump Explodes Coal Dust at Dolomite

Review of Accident Based on Intimate and Painstaking Inquiry—Injured Cable and Broken Car Wheel Found Suggestively Near One Another—Sprinkling, or Rather Dousing, of Workings and Spare Fan Saved Many Lives

By J. J. Forbes*

THE explosion which occurred about 2:40 p.m. Nov. 22, 1922, in the Dolomite No. 3 mine of the Woodward Iron Co., resulting in the death of ninety men and in slight or severe injuries to seventy or more others, was altogether unusual. Rarely do so many conditions combine to cause an explosion. It is believed that much greater loss of life would almost certainly have resulted if the Woodward Iron Co. had not employed means calculated to localize the effect of any explosion that might happen.

To enable the reader to understand the conditions under which the explosion occurred and was propagated a short description will be given of the mine layout. Dolomite Mines Nos. 1, 2, and 3 are all connected, but the ventilation of No. 1 mine is entirely separate from that of mines Nos. 2 and 3; in fact the last two mines are really one. No. 3 mine is opened by a slope driven on a pitch of 30 deg. through rock which at a distance of 850 ft. intersects the coal bed.

The slope, which is laid with two tracks, is about 6 ft. high and has an average width of about 20 ft. In line with the slope is the "yard," or parting, which has four tracks—two empty and two loaded. Its length is 500 ft. The "yard" is provided with a weighhouse, a motor pit, an office for officials, and other suitable conveniences. In the ordinary operation of the yard 12 to 20 employees, including couplers, spraggers, weighman, sandmen and sprinklers were employed. On the morning of the explosion 475 men were checked into No. 2 and No. 3 mines through No. 3 slope, and in addition to this 397 were checked into No. 1 mine, making a total of 872.

Spare Fan Ready for Just Such an Accident

The operation known as mines Nos. 2 and 3 is equipped with two separate and distinct fans, housed in fireproof buildings, one of which is provided for use in case of an emergency. At the time of the explosion the Capell fan, electrically driven, was in full operation. About 75 to 100 ft. therefrom is a Sirocco fan which by simply throwing in "jaw clutches" can be driven either by a gasoline motor or electricity. No. 2 fan pulled about 130,000 cu.ft. of air per minute, 70,000 to 75,000 cu.ft. of which entered through No. 3 slope, the rest intaking through slope No. 2.

All coal is loaded into wooden cars which are provided with tight gates and is transported from the live workings to the yard by ten electric locomotives. It is hoisted to the tipple by means of an electric hoist and is discharged into storage bins at that point by means of one of two 5-car rotary dumps. For the haulage of the coal ten electric locomotives are provided. Running along the right rib of the slope was a 3,300-volt armored protected cable. This feeder consisted of three conductors of No. 4 copper wire stranded, each covered with varnished cambric and separated by jute. Around the cable was about ⅛-in. lead insulation and over the lead were two flat steel spirals ¾ in. wide wrapped so that one covered the spaces left by the other. The cable was guaranteed for 5,000 volts working pressure, according to a statement made at the coroner's inquest by W. M. Johnson, electrical superintendent for the company.

F. E. Dean, tipple foreman, testified at the inquest that the tail car in a trip of three empties jammed in the guides of the west rotary dump on the tipple. Chain blocks which were badly worn were first used by the tipple crew for pulling the trip, but without success. In an effort to release the car that was jammed the two front cars were disconnected and pulled forward for a short distance.

Broke a 60-Lb. Rail in Hurrying from Dump

The hoisting cable being disconnected, the cars ran backward with considerable momentum and dislodged the jammed car, breaking a 60-lb. rail that, to keep the cars from running away, had been placed across the riding ring of the dump about 2 ft. above the tipple rail and about 10 to 15 ft. below the jammed car. The cars started back into the slope running on the west track and as they neared the bottom they crossed over to the east side and were wrecked against some loaded cars that were standing in the yard.

W. M. Johnson testified at the coroner's inquest that after the explosion, but on the day on which it occurred, he had found a flattened place in the cable about 100 ft. from the foot of the slope and that this flattened place caused two of the three strands of wire to cross, forming a short-circuit. Johnson also stated that he found a broken car wheel about 15 ft. below the flattened place in the cable.

The Bureau of Mines' investigators had an opportunity to examine this cable during the coroner's inquest and afterward, and they observed the flattened place in the cable and the place at which the cable "blew" or arcked. It is believed that the cable was ruptured by a flying piece of steel, probably a car wheel from the wrecked trip, as there was no evidence that would indicate that the cable was ruptured by a car or cars running over it. It is said that whenever a trip broke loose from the tipple and wrecked in the yard it almost invariably threw clouds of coal dust into the air so dense that for some minutes it was difficult to see any considerable distance in the yard. Undoubtedly this wreck brought about the usual dense cloud of dust, and the short-circuiting of the cable with the arc thus resulting ignited the coal dust which was thrown into suspension when the cars piled up. F. E. Dean, tipple foreman, testified before the coroner's inquest that almost imme-

*U. S. Bureau of Mines.

diately after the trip was wrecked in the slope, particles of coal started to fly out of the mouth of the slope followed by flame.

On the afternoon of the explosion, as a result of the cessation of dumping in the tipple, about thirty employees had gathered on the yard, in addition to those regularly employed at that point. Among these were seven locomotive crews (three per crew), the foreman, the master mechanic, the machinist, the electrical workers, the transportation foreman, the sprinkler, and the assistant mine foreman.

The explosion wave worked inby, filling the yard with flame and killing practically everyone in the yard either by burns or gas, and also sent flame with considerable force out of the mouth of the slope, igniting such parts of the tipple superstructure as were of wood and this despite the fact that the building was located about 200 ft. from the portal of the slope.

It is reported by survivors who were on the tipple at the time of the explosion that there was much flame and that the smoke was so dense on the tipple that for some time no one could see what was transpiring. After leaving the yard the flame started into the haulage entries through openings which radiated therefrom. In the most of these haulageways the trolley lines were still found in place after the explosion and although few doors were blown out and brattices forced, the violence was not great, except possibly in the motor-generator room or substation where the flame found an abandoned drift in which the dust could gather.

Rescuers Without Apparatus Enter Mine

In a number of instances men rushed out of their working places upon hearing the blast and feeling the concussion and upon reaching the main aircourse, some met the gas which was being borne by the ventilating current toward the fan. Most of the miners who encountered the afterdamp retreated, and later on came out safely in fresh air after the currents had cleared the entries of afterdamp. Some of the men inhaled the poisonous gases that immediately followed the explosion and were rendered unconscious; especially was this true on the west side of the mine.

The fresh air quickly replaced the poisonous gases, however, and allowed rescuers without apparatus to pull unconscious men out of the gas pockets and to place them in fresh air where they might recuperate. Unfortunately a number of miners who were overcome by the first flow of poisonous gases did not recover and were found dead. In all, fifty-seven bodies were found in the yard, and twenty-nine bodies within several hundred feet of it, mostly along entries. Four died in the hospital, making a total of ninety dead.

The explosion was stopped within a few hundred feet of the yard owing to the efficient manner in which the mine workings had been sprinkled. In other words, due to the lack of dust for propagation, the explosion was localized and confined principally to the main entries and passageways leading from the yard of No. 3 slope. According to the statement of C. E. Nesbitt, chief state mine inspector, at the coroner's inquest, the mine was moist before the explosion, otherwise it would have extended throughout the mine workings.

The verdict of J. D. Russum, coroner of Jefferson County, Alabama, as to the cause of the Dolomite No. 3 mine explosion is as follows:

"After making a thorough investigation in reference to the 89 men* who lost their lives in the explosion of Dolomite No. 3 mine on Nov. 22, 1922, about 2:40 p.m. and after carefully studying the testimonies of all the witnesses which were practically in agreement, I find that the explosion was caused by the rupturing of a high-powered cable. After making a thorough investigation of said cable I find that the rupture was caused by a heavy blow from a flying piece of steel, possibly a broken car wheel, from a runaway trip of cars. I am unable to place the responsibility on any one individual, as the disaster was merely an accident."

Sprinkling lines traverse main and side entries, 4-in. and 2-in. pipe lines being employed for this purpose with taps usually placed at 100-ft. intervals. Common garden hose in 50-ft. sections is used for sprinkling both rooms and entries. A corps of ten sprinklers were continuously employed by the company to sprinkle the mine and they performed that task not only in the entries but in the rooms also. The rooms and entries are washed clean of dust, the work of thus sprinkling the entire mine taking approximately three days.

It is felt that a large number of lives were saved by the efficient method of sprinkling employed and a very disastrous explosion prevented which undoubtedly would have propagated into the workings of No. 2 and No. 3 mines and possibly into No. 1 mine. Again, it is believed that a large number of lives were saved by the commendable way in which the ventilation fans were arranged, for within 15 minutes after the explosion caused by the short-circuiting of the cable in No. 3 slope, the Sirocco fan, driven by a gasoline motor was in full operation, pulling full currents of fresh air through Nos. 2 and 3 slopes, thereby clearing the affected and unaffected parts of mines Nos. 2 and 3 of poisonous gases. The prompt starting of the gasoline fan after failure of that driven by electricity, whereby air currents were kept going at almost normal velocity, permitted the rescuers as well as the workers to travel in fresh air within a comparatively short time after the explosion.

*This verdict was given Dec. 15, 1922. Since that date one more man died in the hospital, making a total of 90 dead.

A Spanish Coal Field; the Wonder Is That It Was Not Worked Long Ago

DESCRIBING the Villablino coal field of Spain, H. M. Morgans, speaking before the South Staffordshire and Warwickshire Institute of Mining Engineers, said it measured 3¾x17½ miles. The coal beds are tilted steeply, mostly between 50 and 90 deg. parallel with the axis of a range of hills. Owing to the great pressure and movement the coal is tender. The range has been cut by half a dozen valleys running north and south at right angles to its axis. For this reason the coal seams can be worked by level driven on the strike from the sides of the valley or by cross-measure roads from the main east-and-west valley south of the range. There are nine to twelve seams, all over 20 in. thick. The total thickness is 36 ft. The interval between seams varies from 66 to 164 ft., and the character of the coal ranges from semi-bituminous to anthracite, with 20 per cent of volatile matter as a maximum. The ash content runs from 8 to 16 per cent, and heat values exceeding 14,000 B.t.u. have been obtained. The coal is mined by overhead stoping, working in steps and packing with dirt on which boards are placed to keep the coal clean. This packing partly comes from the mine but when needed is brought from outside.

Dispatching of Mine Cars at the Rolling Mill Mine

One Man Regulates from Telephone Center Entire Distribution of Cars Except in Night Shift and "Frogs" Sections Thus Providing Car Supply in Exact Proportion to Needs — Heading Trackage Covers 55 Miles

BY GEORGE ATWELL RICHARDSON*

THE Rolling Mill Mine of the Cambria Steel Co., at Johnstown, Pa., which was opened more than sixty-seven years ago, has extended over a larger area than probably any other one mine in the United States. Its operations have covered approximately ten square miles. The distance to the farthest working face is five miles, and the total heading trackage actually in use aggregates about fifty-five miles. The record daily production of coal, made as recently as May 31, 1921, is 3,872 net tons.

At first glance figures such as these would suggest that the dispatching problems at this mine are of considerable magnitude and that the method of handling coal would be of a more or less complicated nature, involving much work and planning. As a matter of fact, however, the dispatching of trips is handled in a surprisingly simple manner with great efficiency, the details of which follow:

At the present time six sections of the mine are being worked. The sixth, or last, which is known as the "Mill Creek" area, is operated only on the night shift. Coal is hauled during the day from the other five sections, which are known as "Frogs," "Klondike," "4 Left," "6 Left" and "33 Level."

DISPATCHER ALLOTS CARS AMONG MOTORMEN

The trips are controlled by one man who is known as the dispatcher. He has full control of the allotment of cars, running of trips, etc. He is located in a brick office (see Fig. 1) about one mile to the east of the main, or No. 26, sidetracks where the trips are made up. Close by the dispatcher's office is the head of an old three-track siding marking the end of the rope-haulage system which was abandoned only a comparatively short time ago. All gathering was done to this point. It is interesting to note that despite the age of the heading and its width, but little timber has had to be used for its support.

Coal is gathered by mules and storage-battery and electric locomotives. Mules are used where the gradient is so steep that the miners cannot push their cars from the working faces to the room necks. There are three mules in "6 Left" section and two in the Klondike. All the coal in the "Frogs" section is gathered by mules.

Storage-battery locomotives are used in certain locations owing to the presence of gas. Two are used on "33 Level," one on "4 Left," one on "6 Left" and one on "Klondike." All of these locomotives are rated as 7-ton machines. Cars are gathered in the Mill Creek section with trolley locomotives, for gas has never been found in that area. In fact for all purposes it is a separate mine.

For main haulage and for special purposes five 15-ton and three 10-ton trolley locomotives are provided. As a rule the hauling is done with one 15-ton and one 10-ton locomotive working in tandem. The normal trip averages about 80 cars, each holding about 1 ton 1,400 lb., but it is of record that one 15-ton locomotive hauled 103 cars over this grade.

The cars in use at the present time number about 1,000, of which 200 are allotted to the "Frogs" section. These latter are older cars, which can be used to advantage at this place because the haul is short.

The dispatcher's office is, of course, the nerve center of the mine and all mine telephones connect through it, and messages to the outside must be so routed during the daytime. At night a direct connection with the outside is maintained.

The present telephone system has three circuits and the three switches and the dispatcher's telephone can be clearly seen in Fig. 2. In all, connections are made to sixteen telephones. What these are is shown in the following table:

Switch No. 1 (Left in Fig. 2)	Switch No. 2 (Center in Fig. 2)
Outside Connections	
Supply Office	
Machine Shop	Frogs
Power house	Elk Run shaft
Foreman's office	Upper end, Elk Run siding
Switch No. 3 (Right in Fig. 2)	
No. 4 Left section	Bottom Mill Creek shaft (coal taken up here for boilers)
No. 33 level	No. 4 left side track (used mostly in bringing men out)
No. 6 left	Klondike
Mill Creek	No. 26 Siding
Pumproom	

The actual details of the dispatching are as follows: First in order comes the question of the proper distribution of cars. At "Frogs" that matter does not have to be considered, as the supply of cars will always take ample care of all the requirements of this section.

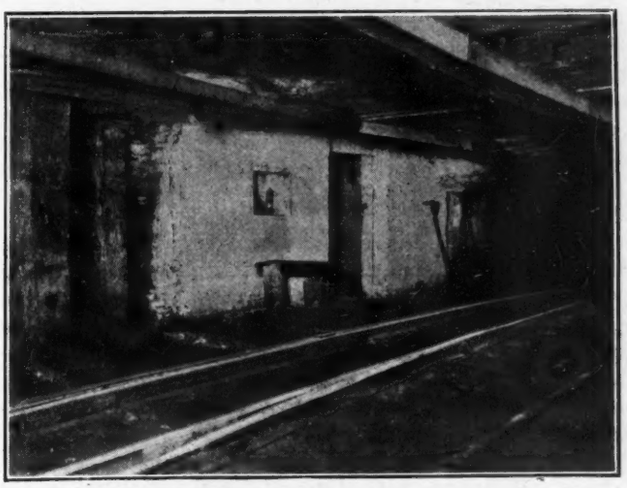


FIG. 1—EXTERIOR OF DISPATCHER'S OFFICE

The work of dispatching is based on a continuous record. The dispatcher knows just how many cars each section has received and can compare it with the number to which its capacity entitles it. In mines where dispatching is not checked by such a record injustices are likely to occur. Note the care with which the trolley wires are guarded.

*Midvale Steel & Ordnance Co., Cambria Steel Co.

NOTE—With the growth in size of modern coal-mining operations the problem of dispatching is rapidly becoming one of great importance to mine-operating officials. This is an account of the methods used in an operation which has been described in other articles in *Coal Age* by the same author.

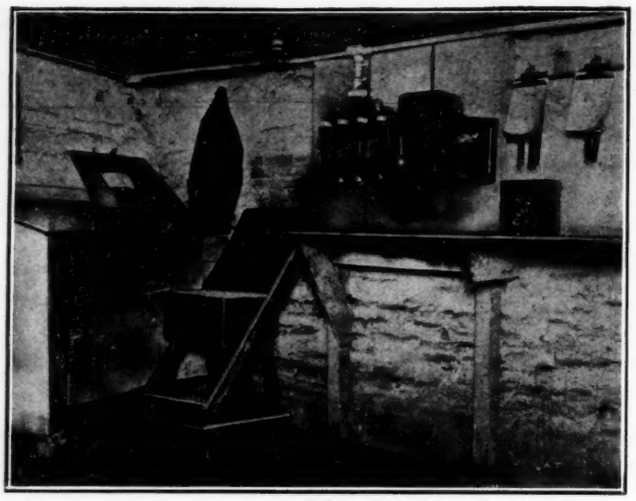


FIG. 2—INTERIOR OF DISPATCHER'S OFFICE
Here is the central station for sixteen telephones in various parts of the mine. The dispatcher arranges from this office for an even distribution of the cars at all points.

As a result the dispatcher pays no attention to it other than to get a record at the end of the day of the total number of cars loaded and hauled from these workings to the Elk Run shaft.

In the other sections a shortage of cars might often occur. The manner in which they are distributed to the different working faces depends entirely on the dispatcher's judgment based on his knowledge of the track system, the coal supply and other conditions.

All cars are distributed to these sections by gathering locomotives working to and from No. 26 sidetrack. The switch boy at this point attends to the telephone, the dispatcher giving him orders as to the number of cars to be allotted to each locomotive.

Outgoing trips operate on approximately 45-minute schedules, subject to the dispatcher's orders. A simple record is kept of these, which, however, meets all the present requirements. It consists of nothing more than a form ruled in pencil and filled out each day as shown, the record for Dec. 15, 1922, being taken as a typical example:

RECORD OF CAR APPORTIONMENT, DEC. 15, 1922

Trip No.	Frogs	Klondike No. Cars	4-Left Cars	6-Left Cars	33-Level Cars	Cars Per Trip from 26 Sidetrack	Time Net	Output Tons
1	..	24	30	..	15	69	8	194
2	..	22	27	23	31	103	9	336
3	..	26	32	23	22	103	10	512
4	..	26	33	25	33	117	11	763
5	..	20	32	28	33	113	12	1,070
6	..	23	32	27	..	82	1	1,300
7	..	30	32	24	33	119	2	1,441
8	..	23	29	31	33	116	3	1,680
9	..	22	32	32	33	119	4	1,925
10	..	21	..	24	31	76	5	2,347
Totals		237	279	237	264	1,017		

As is evident, the totals shown in the last column are cumulative. The final total and also that for total cars shipped includes cars from the "Frogs" section.

The night shift works only in the Mill Creek section and when it is through in the morning a pencil memorandum showing trips handled, cars loaded and hauled, and cars left for day hauling, is available for the dispatcher's use in planning his work.

Coal from the Rolling Mill mine is hauled to a rotary dump at Elk Run shaft, dumped down a well and loaded again on the lower level for direct haulage to the coke ovens. This lower level is a part of the Rosedale Mines and dispatching is handled independently from the Rosedale end.

From this short article it will be seen that despite the size of the mine in question, the problem of dispatching is an easy one to handle, given a capable dispatcher who knows his mine and is on the job.

Should Starting of Electrical Machinery Be Regulated by Automatic Devices?

BY H. H. JOHNSTON*
East Pittsburgh, Pa.

IN THE article entitled "Year 1922 Tackles Hopefully Many of the Big Problems of Coal Production and Preparation" that appeared in *Coal Age* Jan. 18, pp. 89-91, the author says:

> One wonders whether the time will not come when the man who runs a locomotive or even a medium-sized hoist will be afforded opportunity merely to start the sequence of actions by which full power is developed or shut off, instead of being able to throw the controller handle with utter disregard of all the rules of proper operation. This provision is already embodied in electric railroad work. Why should the motorman have it in his power to "goose" a motor? If we had electricians to handle electric machinery the present equipment might be properly used, but with machines started by motormen, machine men, ditch diggers, pumpers and hoistmen little latitude of choice should be allowed. It is to be hoped that within the space available on the locomotive, mining machine and loader some means will ultimately be found to put devices which will prevent the motorman, cutter and loader, respectively, from abusing their motors.

These remarks were forwarded me by the author in a letter under date of Jan. 6, asking for my opinion relative to their practicability. They express without a doubt a thought to which operators, manufacturers and engineers have given much consideration. The conditions under which mines are operated vary so much, particularly in main and gathering haulage, that automatic control of the character in use on railroads is, I believe, entirely out of the question.

The locomotive of the mine is called upon to operate under conditions which vary widely with different kinds of operatives, trip lengths, track conditions, grades, etc. On the other hand it must always be remembered that in street-car service, owing to a fear that too great an acceleration of the car would cause discomfort to passengers, the maximum speed of acceleration usually is limited. Furthermore, the cars in street, elevated or subway railway service which use automatic control actually carry the burdens which they transport instead of trailing those burdens behind them in a trip of cars. This weight bears down heavily on the wheels so that the acceleration sought rarely is enough to cause the wheels to slip on the rail. On the other hand, the mine locomotive in the course of every run may be required to start at the slipping point of the wheels, as, for instance, when starting the train on an upgrade. It also may be called upon to start with an inordinately light load, where the tractive effort would be much below normal.

In railway equipments the usual practice is to use a current limit relay which during the acceleration periods automatically controls the various switches or contactors. This relay lifts when the accelerating current has reached a predetermined value. Under these conditions, should the motorman attempt to notch the controller quickly to the last step, the limit relay will lift as he passes a certain point and the accelerating switches will not be brought into action till the limit relay will drop, and this will be when the accelerating current decreases as the result of increased car speed.

Where remote-control devices are used—that is, where a master controller is operated by the motorman and

*General engineering department, Westinghouse Electric & Manufacturing Co.

contactors are controlled from the master controller—it is comparatively easy to provide for the automatic control of the motor and to do it without additional equipment. But when we come to the mine locomotive, it is, I believe, necessary to remember that we must have notch-by-notch control even if we do have the automatic feature. There are many times when mine locomotives must be operated for a long time on the resistor points. Any automatic features used to take care of the needs outlined in the article quoted, therefore, must be used in conjunction with the ordinary step-by-step control.

If automatic acceleration were provided in the same manner as on street railway cars either the current limit relay should be changed in every case so that it would be adapted for the acceleration of the locomotive and its trip under the particular load condition encountered or the automatic devices for the control of acceleration should be more adequate than could be provided by the use merely of a current limit relay. In conjunction with that device should be one dependent on the time element so that under all conditions provision would be made for bringing in the accelerating switches, one after another, with a definite time interval between them. Automatic acceleration by the current relay is not used in main-line electric, freight, passenger or switching locomotives for precisely the same reasons that operate against its use in mine-locomotive service.

Where Regulation Has Been Made Automatic

Perhaps the only instance around coal works where locomotives have been controlled by automatic devices has been on some of the more recent quencher locomotives used at byproduct coke plants. But these are operated under a loading and grade condition that is always practically the same, day in and day out and trip after trip. In these installations a master controller is used, having the usual notch-by-notch scheme of control, but having in conjunction with this a provision for automatic acceleration in case the man who handles the locomotive wilfully or otherwise turns the handle of the controller too fast to the last or intermediate running points. On these locomotives electro-pneumatic unit switch control is used. With it is embodied a current limit relay and, as stated, manual control.

Various mechanical devices have been designed for use with mine-locomotive controllers. Drum controllers also have been put into street-car service. These make it necessary for the motorman to consume time in operating his control handle from notch to notch. Motormen become expert in handling most of the devices of this kind which have been put on the market, and even though they are supposed to delay the motorman materially in passing from notch to notch they do not always prevent him from abusing the equipment entrusted to his care.

Undoubtedly the question the writer has in mind is: Will the control operation become eventually so simplified that the sequence of actions will be started by the pressing of a push button. It is difficult to see how this will come about, especially in mine-locomotive service, but it is not at all impossible to foresee that we may yet use a master controller, a set of contactors, and a reverser in conjunction possibly with a current limit relay so as to provide sequence of the control circuits, provision being made on the master controller and between the various contactors for the operative to obtain notch-by-notch acceleration either to resistor or running points.

Under existing conditions at many mines the motormen and operators of other electrical equipment cannot be penalized sufficiently for the damage they do when they operate their controllers in the manner described in the article. For reasons not electrical, such actions under certain conditions could not be penalized, but perhaps there are other ways of preventing the abuse of equipment.

I have in mind a sort of recording device that might be planned and applied to the various mine equipments which would tell the operative or would record for the mine superintendent or other official, either directly or indirectly, what savings the motormen and other operatives in the mine have made possible by more careful and capable operation of their controllers.

No doubt if such a device were installed, even though it would show nothing more than the saving in power, a considerable reduction would be made in operating expenses. This would reveal, however, only a part of the saving that would arise from the careful operation of the controller which such a record would cause. There would be a further saving not noted on the record, for the installation of the device would greatly reduce the number of equipments that fail today by reason of power being too rapidly applied to the motors.

British Columbia Seeking Uses for Fossil Resins of Coalmont Mines

IN AN article read before the Canadian Institute of Mining and Metallurgy, R. T. Elworthy and R. K. Carnochan discussed the possibilities of using a fossil resin found in the coal on the waste dumps of the Coalmont Collieries, Coalmont, B. C. This material aroused much interest, especially as it is reported to be identical with Prussian amber. Of 400 lb. of the coal sent to the Mines Branch of the Department of Mines of Canada, resin formed about 8 lb. The pieces were about the size of a pea, were irregular in shape, without marked cleavage lines and fairly brittle. Their color varied from opalescent lemon yellow through all stages from brown to black, some showing a green fluorescence. It readily can be separated from the coal by flotation in solutions of sodium or calcium chlorides of specific gravity 1.10 and graded by using solutions of specific gravity 1.03, 1.05 and 1.09. Ultimate analyses gave a composition of about 80 per cent carbon, 10 per cent hydrogen, 9 per cent oxygen, 0.3 per cent sulphur and 0.7 per cent ash.

The amber made an excellent varnish that did not crack but was of rather a dark color. The manufacturers of varnish feared that it would not compete with copals such as the Zanzibar, Kauro, Manila and Congo gums.

Large-sized blocks of amber are formed from clippings and waste by the action of heat and pressure. According to one process the material is heated to 200-250 deg. C. and a pressure of 400 atmospheres applied. Experiments made in the compression of Coalmont resin have not yet been successful, though it is hoped that better results will be obtained with a new mold now being made in the work shops.

But the synthetic resins such as Bakelite, Redmanol and Condensite are rapidly supplanting compressed amber and it is improbable that there is any use for the Coalmont resin in this direction. It therefore seems difficult to find satisfactory uses for the resin unless it can be obtained in large quantity and sold cheaply enough to compete with the darker varnish stains.

Extracting Thick and Steeply Pitching Coal Seams

Galleries Are Extended Either from Shaft or Chuteway, the Coal Thus Entered Being Extracted by Shots in Sides and Roof of Roadway—In Other Sections Diagonal or Vertical Breasts Are Driven and Drawn Without Stowing

By A. Gerke
Waldenburg, Silesia, Germany

NO UNUSUAL difficulties are experienced in the working of thin seams, even when they pitch heavily, but the mining engineer often must face difficult problems if the pitching seam is from 20 to 25 ft. thick, for in such cases methods that are quite efficient with thin seams cannot even be considered. In most instances, where the beds are thick, either cross working or stoping methods have been adopted. Even until recent years one German coal mine has been operating on this latter principle, the excavation being stowed. The seam is from 20 to 25 ft. thick and pitches at an angle of 70 to 90 deg.

Expensive Stowing Methods Abandoned

The results obtained by this method were not at all satisfactory. Though the work was done with the greatest possible care the face of the coal frequently broke down owing to the friability of the coal and the thickness of the coal bed. In consequence the workings had to be substantially timbered. In some places the coal fell for a height of from 60 to 100 ft., and the stopes had to be abandoned and the roadways and airways had to be sealed. This had to be done with exemplary care, for if it were not so done or if when thus performed the seals became leaky, mine fires soon broke out, and hence it happened that in many cases, owing to the danger that the fire would spread, even unmined parts of the seams had to be abandoned.

Furthermore, the cost was too high and the returns were too small, and that was true even when no such accidents occurred. Consequently other methods had to be devised. On account of the unfavorable nature of the seam it could not be mined by working from footwall to hanging wall, stowing refuse in place of the extracted coal. This method, therefore, gave way to the stoping method just mentioned, and that in turn was abandoned for the method described in this article. The two systems used are termed "stockwork" (*etagenbruckbau*) and "working by diagonal stopes" (*diagonalbruckbau*).

The stockworks themselves are of two kinds, according to the character of the rock bed overlying the coal.

The coal area to be mined by stockwork is divided by hoisting shafts spaced at 350-ft. intervals. The small areas thus served are divided again into smaller areas by driving galleries 6 or 7 ft. wide in the middle of the coal bed—that is, at equal distances from the footwall and hanging wall. When these are driven to the full distance of 350 ft. the coal is extracted on the retreat on both sides of the gallery and up to the roadway above. (See Fig. 1.) First of all a raise is made to the gallery above. Then the roadway is widened to the full width of the seam for a length measured along the gallery of 14 to 18 ft. and the coal in the roof is shot down till the upper gallery is reached. Coal pillars are left about 10 ft. wide to separate the broken coal from the "old man," or fallen roof of the excavated area. By leaving pillars of this kind the coal is supported so as to form an arch which can be broken down only by well-located shots in the sides or the roof of the raise.

Arrange to Make Coal Pile Act as Chute

The cars are brought to the edge of the raise, for the coal comes down in such a large quantity that the loaders can work under the protection of the well-timbered roadway. In case sufficient coal does not fall

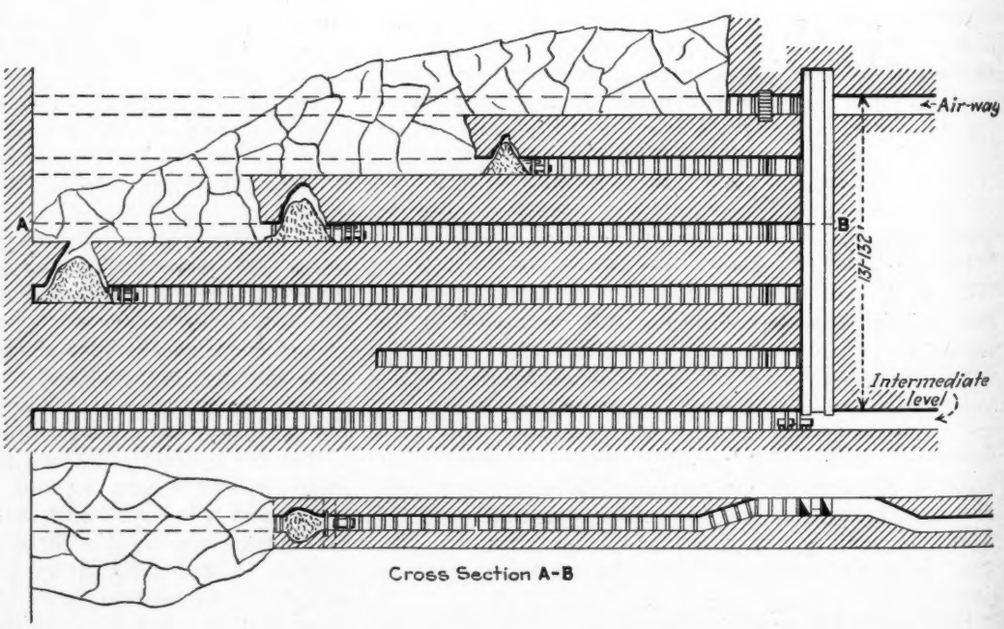


FIG. 1

Stockwork

In steep pitches over 50 to 70 deg. an inclined shaft is constructed directly on the pitch and galleries are driven along the middle of the seam for 350 ft. The coal above and beside the gallery is drawn out by cutting a raise in the roof, by widening the gallery and then shooting down the sides of the raise, the men working in the third operation on the top and sides of the coal pile.

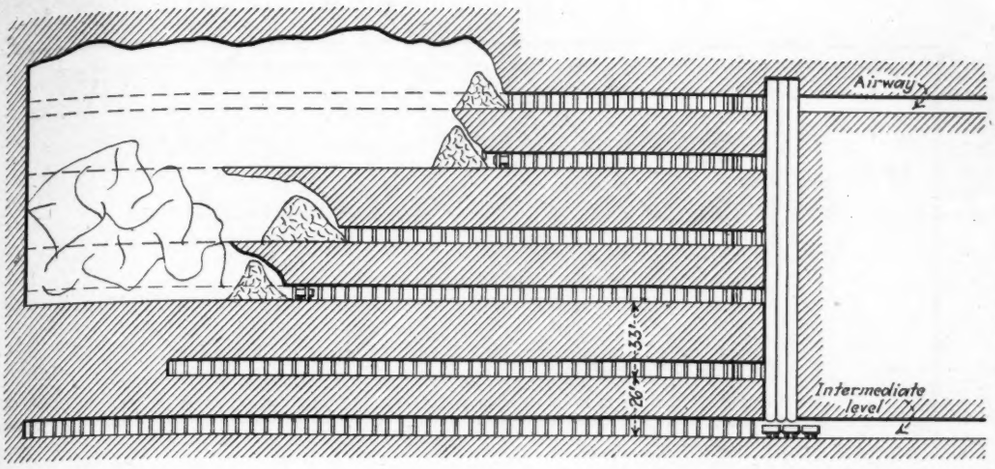


FIG. 2

Another Form of Stockwork

Here the roof is firmer and the seam thinner, 12 to 14 ft. thick. Two adjacent galleries in the retreat are brought back almost abreast and no vertical pillars are left against the goaf.

into the roadway the miners blast the next holes so as to bring down the quantity of coal required. For their own advantage they will not allow all the coal to be removed, for by means of the pile of coal they are able to drill other blast holes more easily. The coal thus piled on the roadway can be removed when the lower roadway has retreated an equal distance.

The cavity created by the extraction of the coal is filled with rock which falls from the hanging wall and the coal which has been left to protect the raise. The roof does not fall in large quantities but gradually.

If the hanging wall is solid and the seam runs only from 10 to 14 ft. in thickness the type of working illustrated by Fig. 2 is preferred. Here two galleries are worked at the same time and by one crew of men. No pillars are left to protect the raise except as a roof to every second roadway.

As the driving of shafts delays operations, and is expensive, entailing much deadwork, diagonal passageways rising at 45 deg. are now used in their place. These are driven as a rule without timber, and in them is placed an open wood trough. (See Fig. 3.) These chuteways are driven and maintained at less cost than inclined shafts, and the coal thus lowered to the roadway is broken less than if dropped down the full pitch of the seam.

Unless the inclination of the bed exceeds 50 to 70 deg. the stockwork method cannot be used to advantage, for the coal will not slide down to the point in the roadway where the cars are to be loaded. For this reason where the coal is of that lesser inclination the operation is by diagonal breasts, as shown in Fig. 4. This method has advantages over stockwork, for less development is needed, no coal is lost, the miners can produce more coal and less timber is used. Furthermore, a large percentage of the coal produced by this method is in large lumps.

The area to be mined is opened up by breasts inclined at 45 deg., the coal being withdrawn from the lower level. After the second mining is completed no pillars are left. The miners drill their blast holes standing on the coal already blown down. It was found that when working by stockwork or by diagonal stopes the miners produced 13 tons, where before, working in the stowed stopes, they mined only 4 tons. The costs of timbering were reduced one-eleventh and the wage cost of haulage one-third.

A modification of stoping in which the area is first divided into longitudinal pillars has recently been used in a seam dipping at 30 to 50 deg. (Fig. 5.) The area to be extracted is divided into sections by subordinate passageways from 90 to 145 ft. apart driven up the pitch. Passageways or galleries are driven on the line of strike at right angles to these and at intervals of 33 ft. Mining may be started at the top gallery or at the lowest one.

The longitudinal pillars are split by a narrow breast up to the gallery above. Then concurrently the pillar toward the goaf is drawn and a slice is taken off the pillar on the other side so that in all the seam is removed for a width of about 20 ft. This may be taken working upward or downward. In either case a 10-ft. pillar of coal is left at the top of the gallery to protect the work in the section below. Eventually this coal will

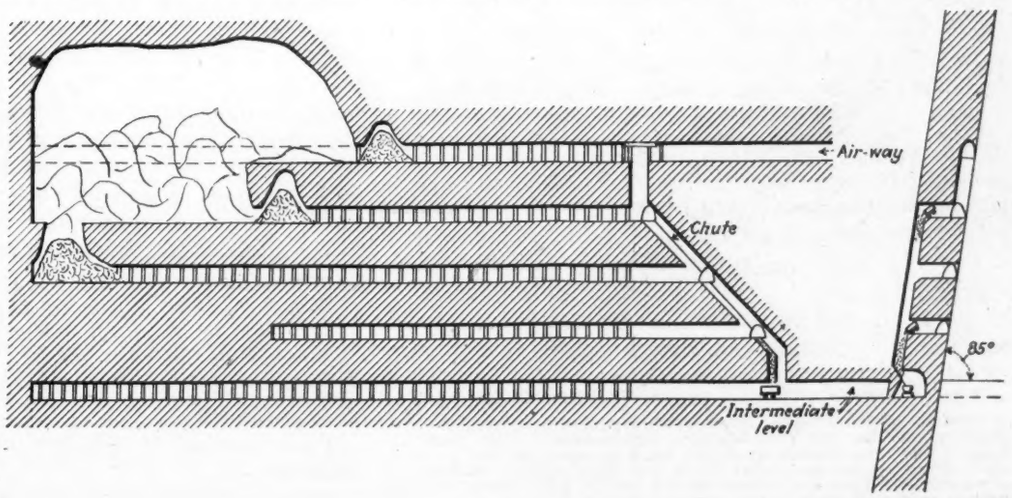


FIG. 3

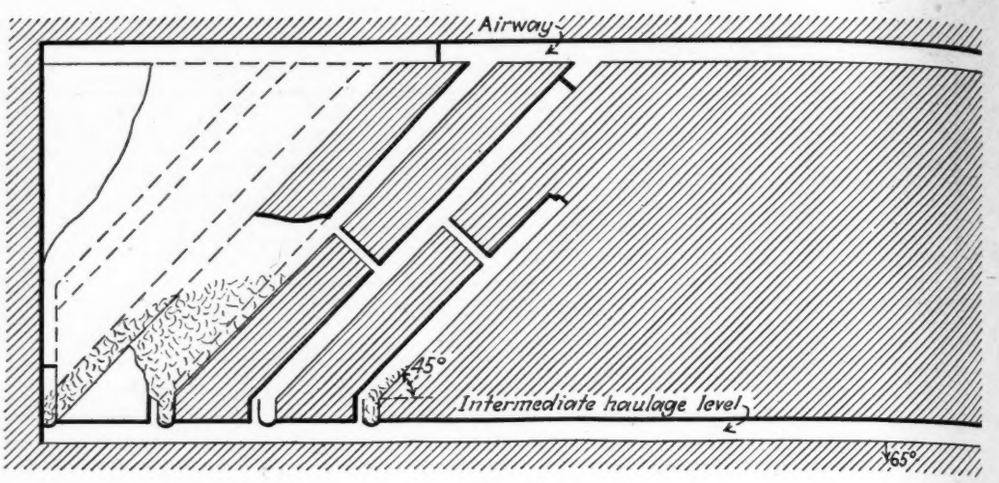
Stockwork with Diagonal Chuteway

Here the grade is almost vertical and the coal accordingly is run down a wood trough through a chuteway driven at an angle to the full pitch—in this case of 45 deg. — thus reducing breakage. This method is known as *"etagenbruckbau mit diagonalen rolloechern."*

FIG. 4

Diagonal Breasts

Where the pitch does not exceed 50 to 70 deg. stockwork cannot be used. Here diagonal breasts are introduced, which have the advantage of saving in development cost, larger tonnage per man, less coal lost, less timbering required and lumpier coal. The method is termed *diagonalbruckbau*. The rooms are drawn starting from the lower gallery.



be broken down and loaded, as also any coal left between the breast and the goaf. This is worked downward.

The coal excavated in any such breast is dropped down to the gallery below and loaded into mine cars. A line of props is set along the coal pillar at the top to prevent it from breaking down. While working the miners stand on solid coal and they can put their ladders on it in a right angle to the inclination of the coal bed. They are well protected, for the coal they are cutting cannot touch the ladders.

After blasting the men can get back to the working face from the upper gallery, which with proper care can be protected from the falling of coal. As for the trammers, they are well protected, being in the lower gallery. The advantage of this method is that it reduces the waste of coal and affords greater protection to the men.

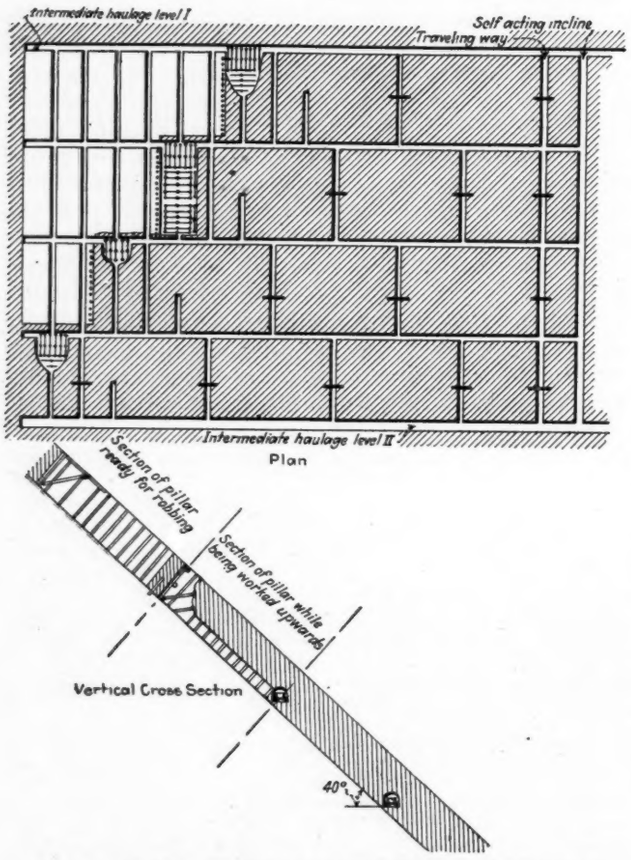


FIG. 5—MINING STEEPLY PITCHING BEDS IN PANELS

Working by longitudinal pillars with inclining sections (*streichender pfeilerbau mit ein fallenden abschnitten*). The work is divided into large panels which are split by small narrow breasts, most or all of the coal being taken out on a retreat, upward or downward. Pillars are left at the top of the galleries to prevent broken roof rock from falling into the breast.

The methods of working just described have proved their value by long use. Of course, they can be employed only if the surface does not need to be supported and when the dip as well as the width of the seam accords with the conditions outlined. These requirements being complied with, the methods can be recommended.

Code for Trade Associations Laid Down

IN place of criminal or even civil proceedings under the anti-trust laws against the Gypsum Industries Association, a decree by consent has been entered in the New York Federal District Court dissolving the association and stating what its members may and may not do in concert in the future. This action followed a widespread investigation by the government and the presentation of evidence to the federal grand jury, which according to report was reluctant to indict but indicated a desire that the government should secure the cessation of alleged abuses growing out of the association's activities. This course of action, far more just and practical than inconclusive prosecution such as has been brought in other industries, was adopted.

The decree agreed to by the United States Attorney and the representatives of the gypsum manufacturers prohibits the weekly or monthly meetings which the government contended afforded opportunities for price fixing, dissolves the association and in its place substitutes a non-profit making corporation. The acts of this corporation which are held to be lawful and to which the corporation is limited by its charter, include advancing or promoting the use of gypsum products by all legitimate means, including research, publicity and advertisement, dealing with engineering and trade problems pertinent to the industry, carrying on educational work, maintaining a bureau to furnish information, dealing with improved methods of plant and mine operation and maintaining a credit bureau.

The injunction provisions of the decree prohibit agreements to

Fix or establish prices for gypsum products.

Establish or maintain uniform prices.

Advance or decrease prices.

Limit, curtail or otherwise control the production of gypsum products.

Fix boundaries of sales territories open only to certain members.

Effect any discrimination in prices.—***The Index.***

Problems of Operating Men

Edited by James T. Beard

Work for Fact-Finding Commission Appointed by President

Cost of Production and Distribution of Coal—Law of Supply and Demand Automatic—Little Need for Intermediaries

ONE of the important duties devolving on the Fact-Finding Commission to which reference has been made in *Coal Age*, Dec. 14, p. 959, will be the determination of the cost of production and distribution of the coal, from its mining till it has reached the final consumer. The work of the commission is to collect data to show the sources responsible for the high prices now being paid for fuel.

In various ways, attempts have been made to explain the present excessive price of coal to the ultimate consumer. Most pronounced of the reasons given has been the high rate of wages paid to miners and mine laborers. This theory, however, would place the responsibility where a more thorough investigation may show that it least belongs

Miners' High Wages Not Alone Responsible for Excessive Cost of Production

The high wages paid to miners and mine workers form a comparatively small item in the actual cost of production and distribution of coal to the consumer. From the time the coal leaves the mine, until it reaches its final resting place in the bins of the consumers, there is every evidence of excessive charges for transportation, handling and distribution by trucks and drays.

For a number of years, there has been a too pronounced differential between the cost of mining the coal and the price paid by the consumer. This differential is too great to be explained by the operation of the natural law of supply and demand. It is well known that this law acts naturally and automatically only when it is unrestricted.

Interference with this natural law has been emphasized by the government as criminal, in the pronouncing as a crime any manipulation in restraint of trade. With equal fairness and justice, our laws might also define as crimes, transactions that divert or obstruct the flow of commodities from the producer to the consumer by the simplest and most direct route possible.

Two Classes of Consumers

In general, there are two classes of consumers: 1. The manufacturer and others who purchase coal in carload lots. 2. The individual or small consumer whose requirements demand less than carload shipments. It is evident that the differential in the former instance is much less than that in the latter, which must involve the service of a retail intermediary as a distributor of coal in retail lots.

The consumer who buys in carload lots must pay a price that includes the cost, f.o.b. at the mine, together with freight charges and expense of handling at destination. On the other hand, the small consumer pays in addition, the cost of handling the coal twice and the profits of the retail dealer.

Handling of Shipments of Coal Through Brokers Harmful to the Industry

There is a class of operators that should be styled "industrial parasites," whose operations are as much against the interests of the producer as against those of the consumer. There is no legitimate excuse or logical reason for the existence of these parasites, in any capacity, in the coal industry. Their operations are confined solely to brokerage in the handling of the product.

There are brokerage firms that do an annual business amounting to millions, on a comparatively small invested capital. Their purchases are sold in the open market or to their clients, at the prevailing market prices, but that is no argument in their favor.

In the handling of large volumes of commodities, such as fuel, it is of the utmost importance that the transportation of the product should be by the most direct route and in a manner to avoid unnecessary transfer charges and demurrage for delay in unloading. All such unnecessary charges increase the cost to the consumer.

In closing, I will mention briefly the opening of small mining operations at the time of the war when the great demand for coal sent the price skyward. These small mines were known as "Snowbirds." They helped in the emergency, although practically their entire output was handled by brokers.

In closing, let me express the hope that the Coal Commission will be able, through its statistical data, to establish the existence of many of the evils that now prey on the coal industry.

Washington, D. C. I. C. Parfitt.

Economy and Supervision Needful

Economy in the use of rails, ties, brattice cloth, etc., important in the operation of a mine—Custom in England—Practice in Rock Springs—Careful supervision needful.

IN HIS interesting letter entitled "Economy in Use of Mine Timber," *Coal Age*, Nov. 16, p. 800, Richard Bowen expresses surprise that, in suggesting ways of improving mining, I failed to mention the practice of economy in the use of mine timber.

Permit me to say, here, that this was not an oversight on my part, as I am a great believer in mine economy, as viewed from many angles. My previous letter did not include economizing in timber, because of lack of sufficient space. However, timber is not the only item requiring the practice of economy. There are rails, ties, brattice cloth and boards, pipes and fittings, together with numerous other supplies.

Just here, I am reminded of a custom in England that might well be followed in American mines. There, when the coal pillar is being drawn back to the entry stump, the deputy, or fireboss, and the miners working the place remain after quitting time and pull out the track and such timber as can be drawn with safety. Nothing is left to be covered up and lost.

If my information is correct, practice in the Rock Springs district, here, allows every miner who has finished his place a bonus of 10c. for each prop he can take out. To my mind, this is a bad arrangement, as only the most experienced men should be permitted to draw timbers from a place about to be abandoned. The work is a dangerous undertaking.

Ascertaining Conditions Underground

A short time ago my attention was arrested by a statement, in *Coal Age*, that some large coal companies were employing private detectives to go through their mines and observe and report on the manner in which they were being operated. This struck me as a good stunt, which might well be adopted in many other mines, where the entire supervision of the underground work is left to one busy foreman, who can hardly keep pace with all that is going on in the mine.

As has been stated by other writers, in *Coal Age*, there is hardly a question but that many wasteful means and methods are being employed in the extraction of coal. I have asked myself the question, Why should not our government take steps to correct this evil? In the conservation of national resources, why permit the operation of mines on a poor basis?

One example showing the need of some more effective supervision of coal operations is the recent explosion at Whitehaven, England, by which, I believe, fourteen miners lost their lives. The explosion occurred half an hour after the men had entered the mine for work, which might suggest that the fireboss had not been able to make a thorough inspection of the workings as required by law.

According to my information the fireboss who examined the mine was compelled to work twelve-hour shifts, which was contrary to the Mine Regulations Act, and his report stated that the district was "clear of gas."

About two years ago I visited in the Whitehaven district going into the Lowca mine where all the miners were using flame safety lamps. Glancing over the deputy's reports for three months back, I was surprised not to find a single gas report; but according to the talk of the miners there was plenty of gas in their places. The fact seemed to indicate that the deputy never made a true report of the mine.

Frontier, Wyo. WILLIAM ALLAN.

Developing Ability in Men

Getting things done a peculiar quality of bosses—As the average man sees himself—The man in a rut—Mistakes of companies in training their men.

A SHORT time ago an article appeared in *Coal Age* (Jan. 4, p. 17) bearing on the relative effects of diplomacy and merit in the training of men to be capable workers. In line with what was said by that writer, I am constrained to suggest another viewpoint in the training of men.

Getting things done is a peculiar quality that very few bosses possess. The big problem for the man who employs men is to impress on the fellow who is not hitting on all six cylinders that there is room for improvement. To bring him to understand that fact and accept, in his own mind, the possibility that he can do better is often a difficult matter.

As a general proposition, a man wants to be the judge of the quality of his own efforts. The average man, as he sees himself, thinks and feels that he is doing well. In the majority of cases, he solaces himself with the thought that he is accomplishing more than for what he is paid.

Often have I noticed that when a boss was doing badly, in comparison with other employees of the company, the matter of any improvement in his methods has to be approached with tact. In nine cases out of ten, the man will be possessed with the notion that he is doing well.

At times, it has happened the man would realize that the results he had accomplished were far from satisfactory. But, in such cases, he would claim that the proposition was a hard one, and give it as his honest opinion that he should be paid more money for sticking to the job.

Unwise Handling of the Man in a Rut

We are all familiar with the man who is in a rut. It is hard to convince him that another method than the one he employs would bring better results. If such a one can be brought to open his heart, however, it will often reveal the secret that, had he the opportunity, he could show the boss a few things that would open his eyes.

Some companies handle a situation such as this by dismissing a foreman who has failed by reason of his overestimating his own qualities. This is a great mistake and the concern that assumes such an attitude will never develop capable officials. Instead, they will find themselves continually going outside of their organizations in search of good men. Such a course is too much of a gambler's chance to be recommended.

In closing, let me say that every large coal company should seek to train its men to a more correct estimation of their own qualities. It may take time but in the end will prove worth while. GEORGE EDWARDS.

Pikeville, Ky.

Teach the Rudiments of Mining in Our Public Schools

Coal mining an honorable occupation—Its importance enhanced when taught in schools.

WITH some little surprise, I read the letter of John Rose, *Coal Age*, Dec. 14, p. 961, commenting on my previous suggestion regarding the teaching of the rudiments of mining in our public schools. Mr. Rose says that this "would be difficult, expensive and in a large measure unprofitable." It would seem that our friend's chief objection comes from the fear that the teachers in our public schools have not sufficient knowledge of mining and the attempt would only prove a failure. It may be true that many of the teachers' knowledge of practical mining is quite limited. At the same time, are they not equally ignorant of the rudiments of agriculture, which is being urged and is now taught in many of the schools?

In making this suggestion, my idea was that the teaching of the rudiments of coal mining would impress the child that it is an equally honorable occupation as

that of farming. Moreover, it would give to the children of coal miners an equal start in the work that falls to their lot, as enjoyed by the children of farmers who will be employed in tilling the ground or in other pursuits.

Unfortunately, the work of mining coal has come to be regarded, in the opinion of many, as a degraded occupation. If this idea is to be eliminated from the minds of our younger generation, it will be necessary to adopt some method that will impress them differently, by showing that the work requires both skill and intelligence, to an equal extent with the occupation of a carpenter, machinist or store clerk.

As far as the cost is concerned, the publications on elementary mining, issued by the various vocational boards, are available as textbooks, and arrangements could be made with most coal companies by which their engineers could assist in giving the needed instructions, say once or twice a week.

Advanced Course to Be Taught in High Schools

In the high schools, a more advanced course of study could be offered by the employment of a competent instructor, similar to those now employed to teach manual training, agriculture, etc. In this district, there is employed, in the high school, an instructor to teach agriculture, at a salary of $2,200. Although essentially a coal mining district, there is no similar provision made to teach coal mining.

That the coal industry is one of the most vital of occupations, no one will deny. In fairness and justice to those who follow this pursuit, the same advantages should be open to this as to other classes of workers. Money spent for that purpose would be a profitable investment, if it resulted in bringing a higher proportion of English speaking employees into the mines. The natural results would be that the average father, himself a coal miner, would have no hesitancy in encouraging his children to follow the occupation that has been his life work.

THOMAS ALLEN.

Mount Harris, Colo.

Inquiries Of General Interest

Position of Mine Regulator and Effect of Air Leaks

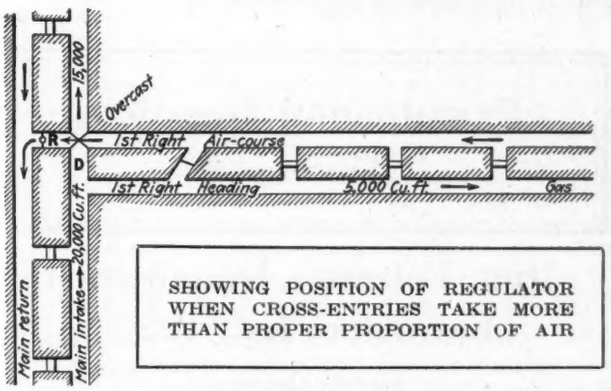
Regulator Required When Door Is Taken Out and Overcast Built—Where Should Regulator Be Placed—Effect of Leaky Door or Stopping

KINDLY permit me to present the accompanying sketch, showing the first-right pair of entries turned off the main heading in our mine, and to explain the following condition that has given rise to much discussion here, in reference to some points.

As shown in my sketch, there is 20,000 cu.ft. of air passing on the main heading. Until a short time previous, there had been a door at the point marked *D*, at the mouth of this pair of cross-entries. The door has now been taken out and an overcast built for the purpose of furnishing a separate split of air to ventilate these entries, which require about 5,000 cu.ft. per min.

We discovered right away, however, that it was necessary to use a regulator, in order to obtain the desired division of the air. Without the regulator, it was not possible to control the air in the proportions desired. The question arose at once as to where this regulator should be placed and this is the first question I want to ask.

Again, it is claimed by some that if the door on the crosscut near the mouth of the cross-entries should leak air, or if any of the stoppings on this pair of entries did



SHOWING POSITION OF REGULATOR WHEN CROSS-ENTRIES TAKE MORE THAN PROPER PROPORTION OF AIR

the same, it is possible for some of the return air to be drawn through this leak back into the intake, or fresh-air current. If that is possible, please explain under what conditions it might take place.

Again, I wish to ask, How would this leak affect the remainder of the current passing through the regulator?

These questions have been under discussion, without reaching any definite conclusion, among a number of mining students attending the State College Extension Course, in Barnesboro. I believe the question first came up at the mining course of the State College some time last summer, and we are all anxious to reach a satisfactory conclusion.

JAMES BACON.

Barnesboro, Pa.

In answer to the first question regarding the proper place to put the regulator, there is not sufficient data given to answer this question directly. The correspondent should have stated how much the mine is developed beyond this first pair of cross-entries on the right, as compared with the development of the entries themselves.

For example, after building the overcast and taking down the door on the main heading, the location of the regulator will depend on whether the cross-entries take more or less than the desired amount of air. This, of course, is determined by the relative resistances of these entries and the balance of the mine. If the cross-entries are taking more than the desired 5,000 cu.ft. per min., the regulator must be placed on that split.

On the other hand, if the cross-entries are receiving less than the desired proportion of air, owing to their resistance being greater than the remainder of the mine, the regulator must be placed at some point on the main current, so as to force more air into the cross-entries.

In placing a regulator of the box type, consisting of a brattice having an opening provided with a sliding shutter, such a regulator must be placed on the back entry where it will not interfere with the hauling of coal. If the regulator is placed on the air split traveling the cross-entries, it can be located at the point marked *R*, in the accompanying figure, or similarly on either side of the overcast where it will be out of the way.

Referring to the second question, the pressure on the intake of a pair of entries is always greater than that on the return and air can never be drawn from the latter into the former, under any normal working conditions.

The reply to the third question is that a leaky door or stopping on the air split, by short-circuiting some of the air, will cause a surplus of air to pass through the regulator and require a larger opening therein, if the desired 5,000 cu.ft. per minute is to be maintained at the face of the entries. This condition, however, will require increasing the power on the air.

Examination Questions Answered

Mine Formen's Examination Lexington, Ky., 1922

(Selected Questions)

QUESTION—*(a) In your opinion, is black powder dangerous in solid shooting? (b) Is permissible powder safer than black powder in solid shooting? (c) Under what condition should solid shooting be allowed?*

ANSWER—(a) Black powder is particularly dangerous in shooting coal off the solid, because of the liability of the occurrence of a blownout or windy shot, by reason of the coal not having been properly mined or sidecut. The large volume of flame produced by the explosion of black powder affords every opportunity for the production of a dust explosion.

(b) Permissible powder is always safer than black powder, because it is practically flameless when the shot is fired, and there is not the same liability for the production of a dust explosion.

(c) Solid shooting cannot be said to be safe in the mining of bituminous coal, although if the shot is well laid by an experienced miner, no bad results may follow the firing of the shot. The practice of solid shooting prevails largely in the mining of anthracite and the harder varieties of bituminous coal.

QUESTION—*What precautions would you take in entering old workings that have been sealed off?*

ANSWER—Ample time should be given, after breaking down the seals and allowing fresh air to enter the place, for the current to dilute and sweep away the dangerous gases that have accumulated. The place should be entered at the intake end. No open light should be used, but only an electric cap lamp or an approved form of safety lamp should be carried. The advance must be slow and frequent tests made to determine the condition of the air by observing its effect on caged mice or birds taken along for that purpose, or the Burrell gas detector must be employed. No one should attempt to enter such a place alone.

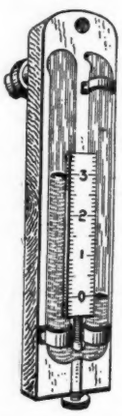
QUESTION—*In case a workman is in contact with a live electric wire, how would you release him? If the man is rendered unconscious, how would you proceed to revive him?*

ANSWER—No time must be lost. Shut off the current if a switch is at hand. Otherwise, throw an iron bar or drill across the wire, on the side of the victim toward the powerhouse, for the purpose of short circuiting a portion of the current and lessening the amount passing through the body. A better plan, however, is to cut the wire on the power side, by a single blow of a sharp ax, when that can be quickly done. Care must be taken to stand on dry ground. It may be possible to quickly drag or push the victim from the wire, using a dry pole for the purpose; or by catching a hold of the man's dry garments and standing on dry ground while so doing.

If the victim is unconscious, he should be moved quickly to where he can have better air and artificial respiration applied in the usual manner. Laying the man prone on the ground with his face turned to one side to admit of free breathing, and the tongue moved forward in the mouth, the operator kneeling astraddle of the man's sides, spreads his two hands over his loins or small of his back and alternately brings a strong pressure on the body to expel the air from the lungs, and again releases the pressure to permit air to enter This alternate compression and release must be repeated at the rate of about sixteen times a minute, corresponding to the rate of breathing. The operation must be continued until the patient is revived or life is pronounced extinct by a physician.

QUESTION—*What is a water gage and how is it read when applied to the action of the air current in mine airways?*

ANSWER—As shown in the accompanying figure, the water gage consists of a glass tube bent in the shape of the letter U, and mounted on a wooden base, one branch of the tube being extended at a right angle so as to pass through an opening in the partition dividing the intake and return airways. Both ends of the tube are open to the pressure of the air.



In use, when the water gage has been placed in position on a partition separating the intake from the return airway, the water in the bend of the tube is depressed by the greater intake pressure of the air and rises an equal amount in the other branch of the tube. The difference in the water levels in the two branches of the tube is measured by the scale, the zero of which is adjusted to the lower level and the reading of the upper level is then the inches of water column, or the water gage measuring the difference of pressure between the two airways.

Each inch of water gage corresponds to a pressure of 5.2 lb. per sq.ft. circulating the air from this point on the intake to the same point on the return. In the figure, the water-gage reading is 3 in., indicating a ventilating pressure of $3 \times 5.2 = 15.6$ lb. per square foot.

QUESTION—*What are timbers used for in mines?*

ANSWER—Timbering of roof, in mines, serves two purposes. First, standing a timber under a loose piece of rock may prevent its fall, until such time as the timber is withdrawn. Again, the condition of the timber serves to indicate the action of the roof and gives warning of any increase in roof pressure that may be dangerous. This is made known by the crushing of the timber or of the cap-piece between the roof and the top of the post. In a few words, timbers are used, in mines, for the purpose of giving the miner warning of any unsafe condition of the roof above him. Mine timbers are not used with the idea of supporting the entire overburden.

Coal Situation Discussed from All Angles By New York Section of A. I. M. E.

Stating that coal in the Government Fuel Yard at Washington cost 16c. less in January, 1923, than in the corresponding month of the year previous, H. Foster Bain, director of the U. S. Bureau of Mines, at the meeting of the American Institute of Mining and Metallurgical Engineers at the Chemists' Club, New York, Feb. 14, explained that this was due to the fact that the coal was purchased only from the large companies that had only slightly adjusted their prices. The freight had been reduced 36c. per ton and the price of coal at the mine had been raised 20c., thus accounting for the reduction in the cost of the government.

He stated that the government handled the coal for $1 per ton but he did not desire it to be thought that the average retailer under the conditions he must face could attempt to handle coal for less than $1.88 per ton. Later in the evening Roderick Stephens, vice-president of the Stephens Coal Co., of New York City, took issue with Dr. Bain, saying that from inquiries he had made in Washington, acting for the retailers, he had been brought to the conclusion that the real cost of handling coal at the Government Fuel Yard was about $1.76 per ton. Dr. Bain admitted that the government business was of an exceptional character and the figures it obtained in conducting its business could not be generally applied. Dr. Bain was not prepared to offer any proposals for the correcting of the alleged evils in the coal situation but he listed those which were being presented: Nationalization, unlimited railroad-car supply, unrestricted competition, larger corporations, general unionization, deprival of the right to open mines except under proof of public convenience and necessity and a grant to the Secretary of the Interior of the right to refuse to lease public coal lands where the output from such lands was not needed to meet public needs.

Dr. Bain in his comments said that to demand that the railroads furnish cars and locomotives sufficient to match the present ability of the mines to produce coal would put an unreasonable burden on the railroads. He declared that he never had been able to understand why coal companies had not more generally combined and why the coal industry was wholly conducted by small companies. He believed that it might be possible to compel anyone who wanted to open a mine to show "public convenience and necessity" before allowing him to construct a railroad switch or before permitting the railroad to do it for him. When a new road is to be built the railroad is obliged to show proof that it will be advantageous to the public. He could not see why the arm of the government could not control the constructional activities of the mines as it has done those of the railroads.

Shows Inconsistency of Government Policy

Referring to our public land policy in the West, Dr. Bain said that the U. S. Government was preaching one doctrine and following an entirely different one. It was generally conceded by everyone in the government and without it that there were too many mines and too many miners. Yet the Department of the Interior was compelled to lease to anyone any coal land comprised in the public domain. Worse yet, it was obliged to require of any lesser that he mine a certain quantity of coal each year on pain of forfeiture. That was done because the government did not want to see public lands gobbled up by those who sought them solely that they might hold them for speculation. To avoid that it was necessary to require that the coal be mined. In view of the fact that the Western mines were already working short time for lack of market, to require the opening of mines seemed a suicidal policy. But what could be done under the law? A man recently approached the department to obtain a lease for 1,000 acres. That acreage contained at the least estimate 45,000,000 tons. It might contain 180,000,000 tons. The department was obliged to demand that the lessee mine 100.000 tons per year. At that rate the land would not be exhausted for 450 to 1.800 years. When asked why he wanted so much, the lessee replied that any less acreage would not impress Eastern bankers and would find them unwilling to advance the money needed. So a nation deploring the fact that capital and labor were being wasted by the excessive development of coal lands was itself demanding that more mines be opened and more men be employed. Could a greater contradiction between principles and practice be conceived?

Dr. Bain added that according to Hugh Archbald the miners when employed spent 3½ hr. working and 2½ hr. waiting for cars out of the 6 hr. that the men spent in their working places.

E. W. Parker, director of distribution of the Pennsylvania Fuel Commission, was the next speaker and the principal features of his address are summarized on page 348. Dr. Parker said that the companies in the anthracite region had expended $30,000,000 in pumping, ventilation and other expenses incurred during the strike. For this they did not have a single ton of coal production to show. They are not trying to get this money back and have not raised their prices except to balance increased taxation. Local taxes had increased inordinately and a state tax had recently been imposed. The anthracite companies realized that owing to the strike they would have only 60 per cent of the coal needed by the consumers during the present coal year. Accordingly the quantity provided to each section was 60 per cent of that accorded under the former U. S. Fuel Administration. Every effort had been made to keep quotas up to, and down to, that figure.

Samuel A. Taylor, consulting engineer and operator, of Pittsburgh, Pa., advocated a freight rate strictly based on mileage plus gathering and terminal charges and said that in the older mining sections the coal land in which small mines could be opened already was almost exhausted. He did not believe that it was just, advisable or constitutional to regulate the opening of new mines on the plea that such mines were neither a public convenience nor a necessity. Mines do not necessarily enter into interstate commerce and therefore are not, at least when opening, matters for federal control.

Roderick Stephens spoke briefly and was followed by R. C. Morse, Jr., superintendent of freight transportation of the Pennsylvania R.R. Mr. Morse declared that the shipment of coal to New England had been hampered by lack of facilities for water transport, and this had made difficulties for the railroads. Where the use of a car for twelve days was needed to transport a carload of coal to Tidewater, that use was extended to sixty or more days when the coal was transported to New England by railroad. The railroads, however, had not fallen down, but had done a larger business than ever. The Northwest demanded a return of its box cars during this period of stress but it had been unwilling to return the open-top equipment which it had borrowed from the East.

George Otis Smith, of the U. S. Coal Commission, spoke in the absence of John Hays Hammond, chairman of the commission. He said that undoubtedly the commission would endeavor to introduce remedies for the coal situation, but, relating the story of the horse down the throat of which the farmer tried to blow some physic and found that the horse blew first, he said that he feared that those who were unfavorably affected by the reforms would blow back so hard that the physic could not be administered.

New England Mineral Crude Oil Receipts

(Gallons)

	1918	1919	1920	1921	1922*
Maine and New Hampshire	24,529,000	23,499,000	40,866,000	27,636,000	30,240,000
Massachusetts	35,616,000	48,552,000	235,703,000	499,441,000	556,430,000
Rhode Island	52,634,000	82,320,000	171,648,000	203,665,000	180,653,000
Connecticut	0	0	0	0	0
Totals	112,779,000	154,371,000	448,217,000	730,742,000	767,323,000

* Importations for October, November and December, 1922, estimated.
Approximately 165 gallons of crude oil is equivalent to one ton of bituminous coa

Prelimnary Statistics of Production of Coke And Byproducts in 1922

Statistics of production of coke and byproducts in the United States in the calendar year 1922, as far as available are summarized in the following tables. The figures are subject to revision of final reports from the producers.

ESTIMATED MONTHLY PRODUCTION OF BEEHIVE AND BYPRODUCT COKE AND OF PIG IRON IN 1922

Month	Beehive Coke (Net Tons)	Byproduct Coke (Net Tons)	Pig Iron (Gross Tons)a
Monthly average, 1920	1,708,000	2,569,000	3,077,000
Monthly average, 1921	462,000	1,646,000	1,379,000
January, 1922	496,000	1,882,000	1,645,000
February	549,000	1,796,000	1,630,000
March	732,000	2,133,000	2,036,000
April	528,000	2,202,000	2,072,000
May	436,000	2,539,000	2,306,000
June	460,000	2,589,000	2,361,000
July	446,000	2,496,000	2,405,000
August	531,000	1,818,000	1,816,000
September	608,000	2,244,000	2,034,000
October	876,000	2,806,000	2,638,000
November	1,138,000	2,925,000	2,850,000
December	1,233,000	3,063,000	3,087,000
Total, 1922	8,033,000	28,493,000	26,880,000

(a) Figures from the *Iron Age*.

PRODUCTION OF BEEHIVE COKE BY GROUPS OF STATES, IN 1921 AND 1922
(In Net Tons)

States	1921a	1922b	Increase, 1922 Tons	Increase, 1922 Per Cent
Pennsylvania and Ohio	4,528,000	6,139,000	1,611,000	36
West Virginia	210,000	549,000	339,000	161
Alabama, Tennessee and Georgia	168,000	468,000	300,000	179
Virginia and Kentucky	380,000	445,000	65,000	17
Colorado and New Mexico	99,000	229,000	130,000	131
Washington and Utah	153,000	203,000	50,000	33
Total	5,538,000	8,033,000	2,495,000	45

(a) Final figures. (b) Estimated from railroad shipments.

BYPRODUCT COKE PRODUCED IN 1921 AND 1922, BY STATES
(In Net Tons)

State	1921a	1922b	Increase (+) or Decrease (—) 1922 Tons	Per Cent
Alabama	2,401,000	3,496,000	+1,095,000	+ 46
Colorado	287,000	365,000	+ 78,000	+ 27
Illinois	1,322,000	1,985,000	+ 663,000	+ 50
Indiana	3,091,000	3,922,000	+ 831,000	+ 27
Kentucky	185,000	459,000	+ 274,000	+ 148
Maryland	293,000	583,000	+ 290,000	+ 99
Massachusetts	294,000	446,000	+ 152,000	+ 52
Michigan	777,000	1,141,000	+ 364,000	+ 47
Minnesota	436,000	455,000	+ 19,000	+ 4
New Jersey	740,000	787,000	+ 47,000	+ 6
New York	747,000	1,520,000	+ 773,000	+ 103
Ohio	2,966,000	4,877,000	+1,911,000	+ 64
Pennsylvania	5,304,000	7,181,000	+1,877,000	+ 35
Tennessee	58,000	28,000	— 30,000	— 52
Washington	24,000	3,000	— 21,000	— 88
West Virginia	188,000	483,000	+ 295,000	+ 157
Missouri, Rhode Island and Wisconsin	637,000	762,000	+ 125,000	+ 20
Total	19,750,000	28,493,000	+8,743,000	+ 44

(a) Final figures. (b) From monthly reports furnished by operators.

Available estimat s on byproducts from coke-oven operations in 1922 are based on the assumption that the quantity of byproducts recovered bore the same relation to the known production of coke in 1922 as in 1921, indicating that the recoveries were approximately: tar, 365,000,000 gallons; ammonia (sulphate equivalent of all forms), 946,000,000 lb.; gas, 447,000,000 M. cu.ft.; and crude light oil, 111,000,000 gallons.—*U. S. Geological Survey.*

Class 1 Railroads Consume 9,736,000 Tons Of Coal in November, at $3.88 per Ton

Class 1 railroads consumed 9,736,000 net tons of coal during November, 1922, as charged to account 394, compared with 8,115,000 tons in November, 1921, according to a report of the Bureau of Statistics of the Interstate Commerce Commission covering 177 steam roads. During the first eleven months of 1922 these roads consumed 85,775,000 tons as compared with 83,994,000 tons during the corresponding period of 1921. The delivered cost per ton in November was $3.88 or 24c. above that for November, 1921. The per-ton cost for the year to Nov. 30 was $3.97 as compared with $4.14 during the corresponding period of 1921.

Fuel-oil consumption continues to gain. During November 155,364,000 gallons were used, as compared with 123,513,000 gallons in November, 1921. The figures for the first eleven months of 1922 and of 1921 were 1,408,291,000 and 1,300,307,000 gallons respectively.

I. C. C. Ignores Wadleigh's Suggestions

The Interstate Commerce Commission has declined in two important instances to follow the suggestions of Federal Fuel Distributor Wadleigh. To meet the anthracite situation in the Northeast, Mr. Wadleigh recommended the issuance of priority orders, which the Interstate Commerce Commission declined to do. This resulted in a flare-up in the House of Representatives, where Representative Treadway, of Massachusetts, cricicised the commission for neither issuing the order nor notifying Congress, if it should have had any doubt as to its authority to take that action. Mr. Wadleigh issued a statement declaring that the priority orders are necessary, in his opinion, but that the commission does not agree and instead has urged the railroad to speed up the movement.

A veritable storm of protest has followed the issuance by the Interstate Commerce Commission of Service Order No. 38. This order instructed the Southern Ry. to assign fifteen cars daily to the mine of the Montevallo Mining Co., at Aldrich, Ala., which were not to be charged against the mine's share of equipment. This action was taken over the protest of Mr. Wadleigh. Mr. Wadleigh contends that the action is not justified by the fuel situation in the South and that it is inequitable to other mines. The National Coal Association, the Southern Ry. and various mine operators have protested against the order.

Ohio River Shippers May Get Long-Desired Nine-Foot Stage in 1924

Completion of three river dams in the Ohio between Louisville and Maysville, Ohio, between now and December, 1924, will make possible a 9-ft. stationary river stage between those two points, according to Major W. W. Parker of the U. S. Engineer's office at Cincinnati, Ohio.

The complete construction of dam No. 40 near Chilo during December, 1924, will furnish the missing link to the 9-ft. stationary river stage, for which river men have agitated since time immemorial. Preliminary operations have already been started, and with best working conditions it is thought work on the dam may be completed before the time expected. The other two dams, Nos. 36 and 38, will be completed this season, according to Major Parker. No. 36 dam is located just above Coney Island, about eighteen miles above Cincinnati, while dam No. 38 is near Rising Sun, Ind.

Finds Coal Moving Faster Than Usual

Despite handicaps of some bad-order equipment as a heritage from the shopmen's strike and of periods of winter weather, the railroads of the United States have been handling coal traffic at a rate in excess of the normal annual movement, according to calculations made by the Traffic Bureau of the National Coal Association. Broadly, west of the Mississippi River coal is seeking a market. Transportation conditions in the South are improving, notably in the Alabama field, the association reports. There continues an acute car shortage in the Appalachian fields, attributed largely to the continued demand for coal. No transportation trouble is reported from the North, excepting that due to weather conditions. No real emergency exists in the bituminous-coal situation from the transportation standpoint, the association reports.

Domestic Exports of Coal and Coke

	Month of December 1921	Month of December 1922	Twelve Months Ended December 1921	Twelve Months Ended December 1922
Anthracite, tons	306,277	381,758	4,176,221	2,365,187
Anthracite, value	$3,439,541	$4,220,591	$45,624,555	$25,350,677
Bituminous coal, tons	770,092	1,468,917	20,652,827	11,083,112
Bituminous coal, value	$3,831,935	$9,437,765	$122,597,038	$65,891,740
Coke, tons	23,034	123,442	273,888	456,733
Coke, value	$197,700	$849,979	$2,760,939	$4,319,538

Washington Opposes Embargo on Anthracite to Canada As Solution of Northeastern Coal Shortage

Washington, D. C., Feb. 19.—With resumption in Washington of the hearing before the Interstate Commerce Commission in response to a Senate resolution to report on the practicability and possibility of an embargo on anthracite coal to foreign countries, which was begun last week in New York, figures were introduced by the Hudson Coal Co. today showing geographical distribution of its deliveries.

This statement showed that from April 1, 1922, to Feb. 15, 1923, the Hudson Coal Co. delivered 990,620 tons of anthracite consigned to the six New England states; 1,122,526 tons consigned to New York State and 442,876 tons consigned to Canada, besides 460,969 tons for other destinations in the United States. Deliveries to New England from Oct. 1, 1922, to Feb. 15, 1923, aggregated 706,001 tons, being 166,087 in October, 168,179 in November, 175,140 in December, 134,021 in January and 62,574 in February to and including the 15th. Deliveries to New York State in the same period aggregated 833,482 tons, being 177,665 in October, 205,047 in November, 201,916 in December, 159,348 in January and 89,506 in February to the 15th. Deliveries for Canada in the same four and half months totaled 359,587 tons, being 76,892 in October, 85,019 in November, 92,483 in December, 75,820 in January and 29,373 in February to the 15th.

J. K. McNeilly, assistant to the general manager of the Delaware & Hudson R.R., testified Monday that that railroad has been devoting special attention to coal traffic, particularly since Feb. 2, when its attention was called to local conditions of distress on account of shortage in northern New York. Severe weather since the middle of January and especially since Feb. 1 has caused delay, he stated. Despite this he said that 630 cars laid out at Mohawk terminal Feb. 1 had been reduced to 155 by Feb. 13, and 631 cars set out on twelve sidings had been reduced to 135 in the same period.

D. & N. Car Movement Reported Regularly

A subsequent storm caused further congestion, but voluntary priority given coal last Friday, Mr. McNeilly believed, would relieve the condition considerably. Priority, he stated, might continuously benefit the situation. He testified the Delaware & Hudson R.R. reports its car movement regularly and freely. It was stated at the hearing Monday, which was conducted before Commissioners Campbell and Cox, that while all of the stock of the Hudson Coal Co. is owned by the Delaware & Hudson R.R. only about half of the coal company's product consigned to Canada goes over the D. & H. and that the railroad handles considerable coal, both hard and soft, from other mines.

Following the hearing in New York City on Feb. 14 and 15, Washington officials apparently decided that an embargo is not the proper solution for the coal shortage in northern New York and New England. At the two-day hearing it was the opinion of several witnesses that it would be unwise to place such a restriction on shipments to Canada.

While the hearing was in progress in New York Senator Lodge, of Massachusetts, introduced into the Senate a bill similar to the one previously introduced by Congressman John Jacob Rogers, of that state, authorizing the President to declare an embargo on the exportation of coal whenever he "shall find that the public interest so requires." The bill provides that the embargo may include either anthracite or bituminous coal or both and may be complete or partial.

J. J. Hickey, of counsel to the commission, stated that a subpoena had been issued to the Hudson Coal Co. to furnish data regarding shipments of coal. He said he did not know if it had been served. Walter C. Noyes, of counsel for the Delaware & Hudson Railroad Co.., who was present, said that W. H. Williams, vice-president of the Hudson Coal Co., was on a vacation. He added that the Hudson Coal Co. had not been a shipper of coal for fifteen years, that it prepares and sells its coal at the mines direct to the wholesale dealer. He added, however, that the coal company stood ready to clear up any specific complaint by furnishing any data it has concerning such complaint. Commissioner Johnston B. Campbell, who presided, told Mr. Noyes that the data were necessary if the commission was to make a complete report to Congress.

During the second day's hearing Mr. Noyes promised he would do all in his power to have the data requested ready to present at the hearing in Washington. He was requested by Mr. Hickey also to have an operating official of the railroad present to explain the delay in shipments of anthracite to various points in northern New York State, it having been testified that the movement of loaded coal cars on the D. & H. ranged as high as thirty-five days from the mines to the railroad yards.

Representatives of the New York State Fuel Administration testified that it would require 20,000 tons of coal in addition to the present allotment to relieve the distress now existing in northern New York. It also was stated that the Hudson Coal Co. has promised to aid them in relieving the situation.

New England Receives More Than Allotment

During the hearing E. W. Parker, director of the Anthracite Bureau of Information and director of distribution for the Pennsylvania State Fuel Commission, produced statistics showing that the New England states under the 60-per cent distribution plan agreed upon by the various state fuel administrators was entitled to 3,857,682 tons of anthracite, that upon Jan. 20, 1923, they were entitled to 2,527,456 tons and up to that date had received 2,534,568 tons, or an excess of 7,112 tons, excluding the Hudson Coal Co. tonnage.

Representative Treadway, of Massachusetts, in Congress on Feb. 16 declared that the fuel situation in his state had reached "an acute stage"; that a 60-per cent allotment of anthracite is not sufficient and that the Interstate Commerce Commission should issue priority orders at once.

Congressman Winslow, from the same state, at the same time declared that there is coal enough within reach of New England to satisfy the present requirements if there were only sufficient motive power on New England roads to pull it, in the face of added difficulties because of ice and snow.

Congressman Treadway characterized as false a newspaper report that there were 1,900 cars of coal standing outside of Boston which the railroads were not moving. He said he got his information from the Fuel Administrator.

W. H. Towns, of the Boston & Maine R.R., testifying before the commission, said no embargo had been declared against anthracite shipments on his road. He said storms this winter had been unusually severe and that the temperatures were 3.9 deg. below normal. Mr. Towns furnished statistics showing the number of cars of anthracite shipped over the road from the D. & H. and other roads:

CARS OF ANTHRACITE RECEIVED BY BOSTON & MAINE FROM CONNECTIONS

	D. & H.		All Roads	
	1922	1921	1922	1921
October	3,983	4,527	5,293	5,587
November	4,489	4,001	5,746	4,914
December	4,124	2,883	5,355	4,020
	(1923)	(1922)	(1923)	(1922)
January	4,464	2,918	5,736	3,731
February (12 days)	1,650	1,864	2,376	2,377

R. Van Ummersen, freight traffic manager of the Boston & Albany R.R., compared the shipments of anthracite over his road this winter as follows:

	1921		1922
October	2,132		1,675
November	2,118		1,723
December	1,687		2,103
January (1922)	1,157	(1923)	1,888

Statistics produced by C. L. Bardo, general manager of the N. Y., N. H. & H. R.R., showed that the number of cars of anthracite received from connecting lines and loaded at tidewater points from April 1, 1922, to Feb. 10, 1923, was 42,887 as compared with 61,016 cars handled in the same

way from April 1, 1921, to Feb. 10, 1922, and that during the same periods the total number of cars of bituminous coal handled had been 66,684 and 73,583 respectively. Normal conditions regarding motive power and equipment would be reached, Mr. Bardo believed, in about four months.

In a statement made at the beginning of the hearing Congressman Rogers said that during October, November and December of last year Canada had received 30 per cent more anthracite and 70 per cent more bituminous coal than in the corresponding months of 1922 and that while retail prices for coal in Canada ranged from $15.50 to $16.50 per ton, in New England they ranged from $18 to $30.

He was followed by W. D. B. Ainey, chairman, and James S. Benn, a member of the Pennsylvania State Fuel Commission, who told of conferences held in Philadelphia at which those present, including operators and shippers of coal, decided that as a result of the strike of anthracite mine workers, production for the balance of the coal year could not be greater than 60 per cent and that it was concluded to make the distribution of coal on that basis. At a later conference held with C. A. Magrath and Frederick McCourt, members of the Advisory Fuel Commission of Canada, it was agreed that the Dominion should be placed on the same basis, but Mr. Benn said it was receiving less than 50 per cent of its allotment. He and Mr. Ainey said they felt that the United States was in duty bound to carry out its agreement with Canada.

Mr. Parker's statistics showed the allotment of anthracite for each state and Canada and the tonnage received by each up to Jan. 20, 1923. He said that under the plan of distribution Canada had received up to Jan. 20, 946,785 tons exclusive of Hudson Coal Co. shipments, out of a possible tonnage of 1,310,333 and that its allotment for the 1922-1923 coal year was 2,000,000 tons.

On Feb. 15 a telegram was received from A. P. Lane, Fuel Administrator for Maine, stating that he could get no information from the Hudson Coal Co. or the Delaware & Hudson Co. Railroad Co. regarding shipments of coal into that state.

One of those who declared it would not be fair to place an embargo on shipments of anthracite into Canada was John F. Bermingham, president of the Delaware, Lackawanna & Western Coal Co., who said that so far during 1922-1923 he had shipped 354,000 tons into Canada.

Mr. Bermingham said that on April 1, 1922, he had on Western docks 361,000 tons of coal. He also testified to making the following comparative shipments:

Shipped to	April 1-Dec. 31, 1922	1923 to Date
Illinois	149,000 tons	155,395 tons
Wisconsin	288,000 tons	227,809 tons
Minnesota	151,781 tons	150,916 tons
North Dakota	24,980 tons	19,185 tons
South Dakota	19,540 tons	17,746 tons
Nebraska	15,379 tons	16,231 tons
New York and East	2,339,000 tons	1,403,000 tons
New Jersey	772,417 tons	518,000 tons

At the first day's hearing Mr. Magrath told the commissioners that Canada's average need of anthracite and bituminous coal was 19,633,933 tons and that the average anthracite tonnage shipped into Canada for three years was about 4,000,000. He said that Canada exported to this country about 2,000,000 tons of coal annually, which, comparing the population of both countries, showed that Canada was doing nearly as well as the United States. He declared Canada was the most uniform market for coal operators because of its climatic conditions. Mr. Magrath said about 800,000 tons of Welsh coal had been imported into Canada. He was sure that the present difficulty regarding shipments would be solved satisfactorily and that Canada was always willing to do its duty toward the United States. Replying to a question Mr. Magrath said that the Government of Canada through the Department of the Interior had a committee looking into the fuel question with a view to using soft coal to a better advantage.

STATE DISTRIBUTION OF ANTHRACITE, PEA AND LARGER SIZES

(Showing 1921-1922 shipments, 1922-1923 allotment, total due, total shipped, overages and shortages as of Jan 20, 1923, in tons.)

(Excluding Hudson Coal Co. tonnage)

	1921–22 Shipments	1922–23 Allotment	Due To Jan. 20, 1923	Shipped To Jan. 20, 1923	Over	Short
New England	6,249,471	3,857,682	2,527,456	2,534,568	7,112	.....
Maine	443,582	266,149	174,382	201,659	27,277	.....
New Hampshire	180,954	108,572	71,136	70,913	.....	223
Vermont	88,463	53,078	34,770	35,584	814	.....
Massachusetts	3,491,070	2,094,642	1,372,351	1,384,964	12,613	.....
Rhode Island	587,877	352,726	231,097	198,483	.....	32,614
Connecticut	1,637,525	982,515	643,720	642,965	.....	755
Middle Atlantic	25,618,926	15,371,374	10,070,912	10,552,030	481,118	.....
New York	11,848,903	7,109,342	4,657,850	4,703,221	45,371	.....
New Jersey	4,689,480	2,813,688	1,843,456	2,079,781	236,325	.....
Pennsylvania	7,267,357	4,360,414	2,856,821	3,055,966	199,145	.....
Delaware	211,641	126,985	83,201	89,336	6,135	.....
Maryland	867,344	520,406	340,955	359,579	18,624	.....
District of Columbia	530,670	318,420	208,620	197,623	.....	10,997
Virginia	203,531	122,119	80,009	66,524	.....	13,485
Central	3,384,262	2,030,557	1,330,361	1,126,818	.....	*203,543
Ohio	352,972	211,783	138,757	119,143	.....	19,614
Indianapolis	248,213	148,928	97,565	60,576	.....	36,989
Illinois	1,780,412	1,068,247	699,884	678,202	.....	21,682
Michigan	1,002,665	601,599	394,155	268,897	.....	125,258
Northwest	2,279,716	1,367,830	896,097	728,880	.....	*167,217
Minnesota	758,361	455,017	298,110	366,302	68,192	.....
Wisconsin	1,326,979	796,187	521,645	294,841	.....	226,804
North Dakota	96,326	57,796	37,867	28,868	.....	8,999
South Dakota	96,776	58,066	38,038	38,378	340	.....
Montana	1,274	764	437	491	54	.....
Trans-Mississippi	316,533	189,920	124,412	113,566	.....	10,846
Missouri	87,134	52,280	34,257	45,913	11,656	.....
Kansas	7,257	4,354	2,850	1,591	.....	1,259
Nebraska	52,396	31,438	20,577	11,199	.....	9,378
Iowa	169,746	101,848	66,728	54,863	.....	11,865
Miscellaneous	90,044	54,029	35,275	25,117	.....	10,158
North Carolina	17,189	10,313	6,764	4,655	.....	2,109
South Carolina	15,583	9,350	6,118	5,038	.....	1,080
Georgia	12,285	7,371	4,826	3,561	.....	1,265
Florida	5,383	3,230	2,009	1,468	.....	541
Alabama	2,353	1,412	930	193	.....	737
Louisiana	9,243	5,546	3,629	1,031	.....	2,598
Tennessee	2,568	1,541	1,007	1,138	131	.....
West Virginia	10,750	6,450	4,218	3,877	.....	341
Arkansas	522	313	209	28	.....	181
Texas	10,121	6,073	3,971	3,033	.....	938
Kentucky	2,996	1,798	1,178	706	.....	472
Oregon	98	59	38	370	332	.....
California	66	40	26	.....	.....	26
Colorado	44	26	18	.....	.....	18
Idaho	2	1	.....	.....	.....	.....
Mississippi	316	190	125	.....	.....	125
Oklahoma	201	121	79	.....	.....	79
Washington	256	154	101	.....	.....	101
Wyoming	68	41	29	19	.....	10
Total U. S.	38,118,952	22,871,371	14,984,016	15,080,979		
Canada	4,035,014	2,000,000	1,310,333	946,785		

* These shortages would become an overage of 70,404 tons, if final distribution by states for 441,164 tons of lake tonnage were available. Including this undistributed lake tonnage in the total makes an overage of 538,127 tons, as compared with the 60 per cent allotment up to Jan. 20.

Coal Commission to Probe Violation of Civic Rights

In an announcement issued Feb. 14 the United States Coal Commission states that it construes as part of its duty in ascertaining "the conditions under which coal is produced" and "the causes which from time to time induce strikes," to make a fair and impartial investigation of the controversies which have arisen from time to time between operators and miners, touching what is known in general terms as the civic rights of American citizens. It has been put in possession of certain charges made by miners against operators and operators against miners, but it does not deem the charges and the character of proof heretofore submitted to the commission to be of sufficient value to enable it to reach conclusions upon these subjects.

It is, therefore, calling upon the United Mine Workers of America, the owners and operators of the mines and the public generally who may have any knowledge of the subject, not at second hand but actually ascertained, to submit to the commission in concrete form specific charges of the denial to any American citizen of any right guaranteed to him by the Constitution of the United States, the acts of Congress, and the decisions of the courts thereunder, definitely stating when and where such right was denied, what constitutional or other right was involved, who the witnesses are and where testimony supporting the same is to be found, and what decision of any court has been rendered on the proposition involved.

It also calls for specific instances of the breach of either the civil or criminal law of the United States or any of the sovereign states of this Union, identifying the crime and the criminal, the time and place such offense occurred, the names of the witnesses and their residence, with a statement as to what the testimony of each witness will be on the subject together with a citation of the constitutional principles, the laws enacted thereunder, or the decisions rendered which may have bearing upon the case.

It requests the presentation of the naked facts, unadorned by either oratory or vituperation. Commissioner Thomas R. Marshall has been authorized to examine and analyze all such complaints in order to facilitate their consideration by the full commission.

It asks that in the first instance these charges and briefs be marked in sending for Mr. Marshall, who is not to decide the question but is to collate and lay before the full commission the various propositions touching the rights of person and property, the denial of such rights, and the breaches of the law alleged to have occurred in the coal industry, to the end that the commission may determine what evidence is to be taken upon these questions, when and where, and to the further end that it may be put in possession of all the alleged facts and of the documentary or other evidence proposed to sustain the charges and the briefs, if desirable, of attorneys, upon the law bearing upon the disputed facts.

It welcomes and invites all information obtainable upon these questions.

The commission notifies the operators, the miners and the public that it reserves the right to fix a reasonable time prior to which it will not investigate.

Midwest Operators and Roads Get Nowhere In Car Rerating Parley

How can the evils of overrating coal mines for car allotment be remedied? The question was threshed for two days in Chicago last week without final decision. Several railroads serving Illinois, Indiana and western Kentucky proposed putting a new plan into effect under which a railroad bureau would fix every mine's car rating. Western Kentucky operators agreed it could be done fairly. But Illinois and Indiana disapproved stoutly. Those two states suggested a continuance of the present plan of rating a mine each month on its previous month's performance, adding compromise clauses, to create the proposed railroad mine-rating bureau and give it the power to quiz every doubtful rating and prove that rating by a three-day test run of the mine where necessary, penalizing every mine that failed in such a test. The railroads took the suggestion under advisement for two weeks.

The conference was called by W. L. Barnes of the Chicago, Burlington & Quincy R.R. The only other railroad taking a leading part was the Illinois Central, represented by J. F. Porterfield. The railroads' proposal was that a railroad board or bureau be created to undertake at once the rerating of all mines on the lines affected, the board to consider past production, labor conditions, track facilities and other physical and economic factors in fixing the number of cars to which each mine is entitled. The carriers further proposed that each rating should stand until changed by the board but that any mine owner who felt aggrieved at any time could ask a re-examination and that in case the board did not get around to make it within 15 days, the mine would automatically take a 10-per cent increase until such time as the examination was made.

The Illinois and Indiana operators were agreed to a man that this plan would work great hardships on the mines, first, because ratings might be fixed by men not expert in coal mining, because ratings would be "frozen" and could not be changed within three or four months in spite of rapid changes in mining and markets which regularly require new ratings for many mines, and because tipple hours would not be the basis for determining working time at a mine. There were other objections, but these were the principal ones.

The basic principles in C. S. 31, under which ratings have been determined for some time past, were held by most of the operators to be the best ever devised. Under that car service circular, now in effect, each mine's car rating is determined each month upon the performance of the month preceding. The reports of the mines to the railroads of hours worked is the basis for fixing the normal rate of output.

In the two-day conference the railroads declared there are all sorts of deceptive reports made by mines as to hours worked and other subterfuges resorted to which have increased car ratings in some mines, principally those of southern Illinois, far above a proper allotment. The railroads declared it to be impossible to check up such reports and that all they can do is to accept the reports, false though they may be. For this reason the railroads want to do their own rating.

Some of the operators frankly admitted the charges. Others stalwartly declared they never had falsified reports and never would. It was contended that the roads could easily check up such false reports and correct the evils existing under C. S. 31 if they only would. The trouble is the roads do not and will not police these reports. Thus they permit falsifying by the unscrupulous operators and make it necessary for some of the others to overrate their mines in order to get anywhere near an even break in car supply. It was freely held that C. S. 31 is entirely adequate if properly applied by the roads.

New Basis for Mine Ratings Near

The recent conference on mine ratings appears to be bearing fruit, according to reports received by the Traffic Bureau of the National Coal Association, which indicate that committees of operators and railroad representatives are making progress toward mutual agreements for the formation of new bases for ratings. At present mine ratings are based upon the tonnage loaded per hour, a factor which increases during periods of car shortage and therefore has a tendency to inflate ratings. It was suggested at the recent conference on this subject in Washington that ratings be based on the physical ability of a mine to produce and load coal in an 8-hour day, and reports indicate that agreements along this line are practically within sight.

Charge Jersey Central Directors Restricted Bids for Lehigh Wilkes-Barre Stock

In the hearing now on in the U. S. District Court in Philadelphia into a complaint involving the sale of the stock of the Lehigh & Wilkes-Barre Coal Co. to the Jackson Reynolds syndicate of New York it was charged that the directors of the Central Railroad of New Jersey had "resorted to every means" to restrict bidding for the stock of the coal company so that they might award it to the Reynolds syndicate.

Testimony was given that an offer of $32,259,720 for the stock by the Lehigh Coal & Navigation Co. had been rejected in favor of the Reynolds bid of approximately $31,500,000, and that the bid of the Franklin Securities Co. of Philadelphia was about $2,000,000 higher than that of Reynolds.

The case is an outgrowth of the order of the U. S. Supreme Court that the Reading company and its underlying corporations be dissolved. The objection to the sale of the stock was made by Isaac T. and Mary T. W. Starr, Jersey Central stockholders.

C. J. Hepburn, counsel for the complainants, said that the directors of the Jersey Central, which owned the Lehigh & Wilkes-Barre stock, had disposed of property worth about $40,000,000 to the lowest bidder. He also charged that Reynolds, who was a director of the Jersey Central and the coal company at the time of the dissolution order, had received "inside information," while the data furnished to other prospective purchasers "was meager and indefinite."

Why the Price of Anthracite Has Risen*

The anthracite operators have estimated that the mines would be able to produce between Sept. 11 and March 31 next, the end of the coal year, 60 per cent of the production of the preceding year, and at the joint request of the Federal Fuel Distributor, the Pennsylvania Fuel Commission and the administrators of the several states they designated a Committee on Anthracite Distribution, whose duty it has been to endeavor to obtain an equitable distribution of the tonnage available, giving to each community in each state its proper proportion, the allotments being based on 60 per cent of the tonnage shipped to each community during the previous year.

There are between 15,000 and 18,000 of these anthracite-consuming communities, and there is an average of about five companies shipping to each community. Every operator, with one or two exceptions, makes a weekly report of his shipments to each community and to Canada. These are all combined on tabulating cards and summarized, shippers being advised from time to time of the communities which shows shipments in excess of allotments in order that they could divert tonnage, if necessary, to points where necessities were greater. The tabulating and summarizing of these returns necessitates the handling of some 100,000 recording cards each week.

The matter of the price you pay for your fuel is not so easy to present in an understandable way. Let me assure you of one thing, however, and that is that with the possible exception of some of your articles of food, you are paying as much of an advance over pre-war prices for other commodities as you are for anthracite. A representative in Congress, a few days ago, was making an attack on prices of coal. He was from Massachusetts. A colleague from Indiana told him that the people of his state were complaining bitterly about the price of shoes, but the gentleman from Massachusetts said he knew nothing about that. Shoes are the chief product of Brockton and some other Massachusetts towns. He knew about the prices his constituents paid for coal but he did not know anything about the prices his constituents got for shoes. And relative to the increase in cost of production I doubt if the price of anthracite has advanced in proportion to the prices of other commodities. It seems to affect one more because it is bought by the ton, instead of by the pound, quart or dozen.

In 1900 the actual labor cost per ton of coal produced averaged about $1 for all sizes. At present the average labor cost is between $4.10 and $4.15. In 1900 the average hourly rate paid to all classes of labor including boys, was about 16c.; in October, 1921, the average rate was about 73c., and there has been no reduction since that date. In 1900 the cost of supplies ran about 25c. per ton of output. At the present time the cost of supplies runs about $1.05 per ton.

In 1900 general overhead expense—that is, the cost of administration, office force, sales agencies, local taxes, etc.—did not exceed 25c. a ton. At the present time they are about 61c. a ton. In 1900 the length of the working day was 10 hours. Today it is 8 hours. The contract miner seldom works 7 hours.

That is to say, the price of anthracite stove size at the mine today has advanced 181.3 per cent over 1900, but the cost of labor has increased 311 per cent. The average hourly rate paid all classes of labor increased 356 per cent. The cost of supplies has increased 320 per cent. The overhead expenses have increased 132 per cent. The length of working day has decreased 20 per cent.

These will give you some idea of the increases in cost that have contributed to the cost of your fuel supply, but they do not tell the whole story. You have read recently in the newspapers of the new tonnage tax imposed upon anthracite and consequently upon you if you are a user of anthracite, as I suppose you are. The tonnage tax is only a part in the great scheme of anthracite taxation. This is to be piled on top of other increases.

*Abstract of an address by E. W. Parker, director of the Anthracite Bureau of Information, delivered at the annual meeting of the New York Section of the American Institute of Mining and Metallurgical Engineers, New York City, Feb. 14, 1923.

Alex Drops in Again—for a While

Alex is "in again," or was for a while. No power of the courts nor of the Governor of the sovereign state of Kansas can keep the ertswhile czar of District 14, U. M. W., out of jail for long. Governor Jonathan Davis thought he had the matter nicely arranged a few days ago when he commuted Howat's sentence in the Cherokee County jail. Alex had only recently moved over to the Cherokee County jail from that in Crawford County, from which he had been evicted by a recently elected district judge.

Howat had just got comfortably settled when the Governor interfered. His only ray of hope was in an addenda to the Governor's commutation by Judge Boss of the Cherokee County District Court, to the effect that before he left jail he must dig up $500, the money it had cost the state to put him there. This little detail delayed Alex's adieux somewhat, but on Feb. 12 some miners of the district contributed the money and Alex was out again.

About this time he received word that the State Supreme Court had affirmed a fine of $100 and a peace bond of $5,000 imposed by former Judge Curran of the Crawford County District Court. And on the morning of Feb. 15 the sheriff of Crawford County was awakened by Alex pounding on his bastile gate. Alex again had decided he would rather be in jail than out—with a $5,000 peace bond cramping his style. So he dropped in for a while. On paying his fine he was released, the judge suspending the $5,000 peace bond.

Negotiation of Contracts Lags Because of Uncertainty on Assigned Cars

Some confusion exists among both railroad purchasing agents and mine operators regarding new contracts for railroad fuel which are to be negotiated before the beginning of the coal year on April 1 because of the uncertainty about the assigned-car situation. The assigned-car case is to come before the Interstate Commerce Commission with oral arguments set for March 1, just a month before the beginning of the coal year. It is not considered possible that a decision will be handed down before April 1. If the commission were to abolish the practice of assigning cars for railroad fuel or were to change the practice it would affect contracts which are made on this basis, hence the atmosphere of uncertainty between the parties to these usual contracts.

Coal Commission Expects to Obtain $400,000 Asked; Plans to Complete Work in September

By Paul Wooton
Washington Correspondent of *Coal Age*

Competition is so rampant in the production of coal that price control hardly would be within the range of probability, even were the operators inclined to attempt it. That the President's Coal Commission has reached that conclusion was clearly deducible from statements made by Chairman Hammond and Commissioner Smith during the course of their conference with representatives of the press on Feb. 17. Other important pronouncements on that occasion were to the effect that for the next few weeks the commission would concentrate much of its attention on anthracite matters; that the commission is not in sympathy with the agitation for an embargo on anthracite exports; that sentiment within the commission is stronger than ever against the railroad practice of commandeering coal and that certain coal rail-rate structures need to be scrutinized carefully.

The comment as to price control followed a statement by Chairman Hammond to the effect that the commission intends to study coal prices over a period of several years. Mr. Hammond predicted that certain economies would be recommended which will have an effect on prices, but he said there is no evidence that producers ever have considered any combination with the idea of bringing about higher prices for coal. On the contrary, he said, there is plenty of evidence of competition of the cut-throat variety. Dr. Smith added the opinion that, were operators to agree on a price for coal, some one of them would cut the price before he had been an hour out of the meeting. These points were emphasized to make it clear that the commission's exhaustive study of prices has as its objectives things other than any thought of uncovering a price-fixing conspiracy.

Prior to the settlement of the wage controversy the commission had in mind the issuance of a labor report on March 15. It now is pointed out by Mr. Hammond that the urgency for that report is passed. For that reason it will be formulated more deliberately. On the other hand, the commission must make its anthracite report on July 1. The study which has to be made of that industry, particularly that phase of it which deals with the royalty problem, is intricate and of the greatest public importance. For that reason an increasing amount of attention is to be given to anthracite during the next few weeks. This will not be to the exclusion of certain work which the commission will do on bituminous coal.

Each time members of the commission have referred to the anthracite export situation, attention has been called to the fact that this lies clearly within the jurisdiction of the Federal Fuel Distributor. At last week's conference, however, Mr. Hammond and Dr. Smith showed some disposition to discuss the matter. It was apparent that each of them is entirely out of sympathy with the agitation for the embargo. Reference was made to the slowness which has characterized the utilization by the Northeast of anthracite substitutes. It was pointed out that, even were an embargo laid, it is doubtful whether that section of the country would benefit, due to the transportation situation and to the probability that Pennsylvania would insist on using that surplus at home. Were the Pacific Coast states, which use British Columbia coal, to be convinced that the embargo is being considered seriously, it was predicted that a protest would go up that would eclipse the agitation for the embargo, to say nothing of the stand that would be taken by American consumers of Canadian power, wood pulp and other imports which might be withheld in retaliation.

The presentation made by the Northwestern Coal Dock Operators' Association apparently impressed the commission deeply. Chairman Hammond called attention to the far-reaching effect of railroad-rate schedules on the coal problem as a whole. He was careful to point out, however, that the commission recognizes the Interstate Commerce Commission as the specialist on these matters and that no recommendation with regard to rate structures will be made until full advantage has been taken of the views of that body.

Chairman Hammond admitted that the importance which he attaches to storage amounts almost to an obsession. He strongly commended the public-utility companies for the progress that they have made in establishing a policy whereby most of their plants provide ample storage reserves. Inducements will have to be held out, he said, to encourage such a policy among the small consumers, but the commission expects to find a way that will result in large storage on the part of the railroads. He pointed out in no uncertain terms that there is no such thing as a "right" whereby railroads commandeer coal. It was revealed that Governor Marshall calls this practice "stealing." Other references made to coal commandeering indicate that sentiment against it is well crystallized among the commissioners.

The commission evidently is fully confident that Congress will furnish the additional $400,000 for which it has asked and will pass the amendment to the act covering legal responsibility for answers to questionnaires. Commissioners Hammond and Smith had a satisfactory conference with the members of the House Committee on Interstate and Foreign Commerce and have assurances from the chairman of the Appropriations Committee that their request for additional funds will be granted. It was stated, however, that the plan for prolonging the work of the commission until Dec. 31 had been abandoned. If the additional $400,000 is granted the commission will have been voted a total of $600,000 for its work. This, it was pointed out, is $153,000 less than the original estimate made by the commission's staff. Even with the additional $400,000, it was asserted, it will be necessary to curtail the contemplated investigation to a considerable degree.

Among other things, the commission expects to establish accurately the percentage of foreign labor employed in American coal mines, along with pertinent data in that connection.

One of the points emphasized at Saturday's conference was the matter of public responsibility in obtaining a greater degree of stability in the coal industry. The real problem of the commission, it was said, is to eliminate the peaks and fill up the valleys of the line indicating coal production. If that is done, the consumers must participate in a large way, it was declared.

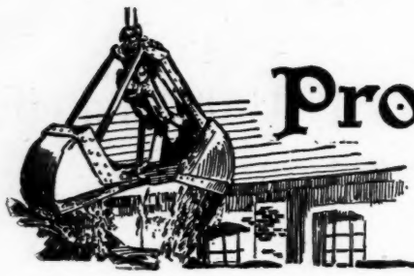
In response to inquiries, Chairman Hammond stated that he is not considering the acceptance of any Cabinet or diplomatic post. He believes a greater opportunity for public service is presented in the post he now occupies. Moreover, he has devoted four months to this work and he construes it to be incumbent upon him to go through with the task.

Union's Logan Injunction Plea Dismissed

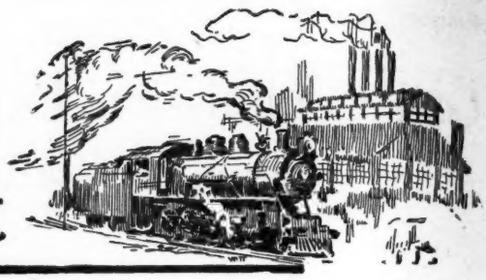
Judge George W. McClintic, in the U. S. District Court at Charleston, W. Va., on Feb. 17 dismissed the petition of the United Mine Workers for an injunction to prevent Sheriff Don Chafin of Logan County and others from interfering with the organization's activities in that county.

Judge McClintic ruled that any of the acts of the Logan County Sheriff complained of were done without authority of the laws of the state and were punishable by the state and that therefore the federal courts had no jurisdiction.

Judge McClintic said he understood the plaintiffs relied entirely on the Fourteenth Amendment to the Constitution in their belief that he had jurisdiction in this case, and quoted at length from decisions holding that the amendments did not apply to individual invasion of individual rights, but only to state action.



Production and the Market



Weekly Review

Every dog has its day—so it is said—but this does not appear to be coal's day. While the price of almost every other important commodity is starting a spring ascension, bituminous coal, the fuel of industry and of half the households of the country, is experiencing a steady decline in price. For six weeks, without a break, the *Coal Age* Index of spot prices of bituminous coal has continued the descent. On the first of this week, Feb. 19, it stood at 288, a drop of 8 points from the previous week and of 87 points from Jan. 8, which corresponds to a decline in average price of more than $1.

While soft coal is failing in price, lumber, iron, steel, sugar and many other commodities are steadily going up in price. In fact the lumber producers are reported to have advised their trade recently that they were facing a runaway market, orders and demand far exceeding their ability to ship, because of an acute car shortage. But if soft-coal prices are dragging, consumption is holding up as industrial activity expands and the cold weather holds on. As an evidence of what is happening in those lines that consume steam coal in summer as well as in winter, and that therefore will put a load on the coal-producing industry this year, the following indications may be noted:

Conditions Favorable to Steam-Coal Trade

Railroad loadings overtopped the best previous record for this time of year, the largest production of pig iron in January since March, 1920, the purchase of cotton by spinners in January at a rate never but twice exceeded in any month, both during the war, and with the number of spindles active on Feb. 1 the greatest ever recorded.

Production of bituminous coal remains fairly constant at a figure just under 11,000,000 tons per week, the operators west of the Mississippi report considerable time lost because of lack of market and those in Illinois and Indiana also charge lack of orders with much of the time not worked at the mines. In the East, however, there is yet sufficient demand to give cause for attributing the present lack of full time output by the mines to car shortage.

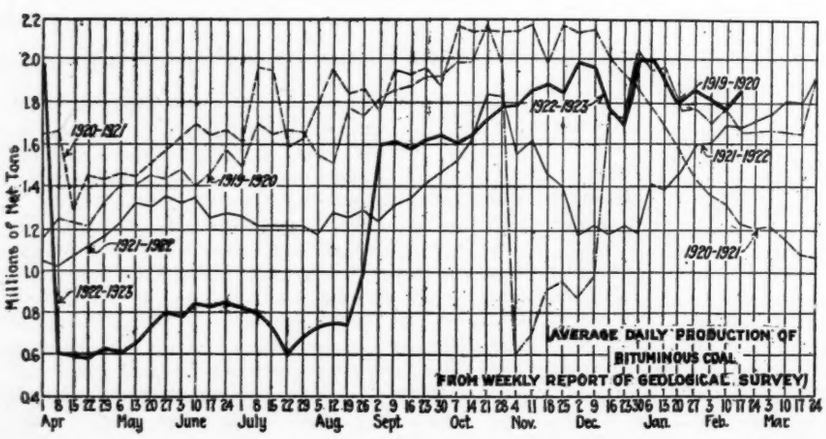
There is little forward buying of coal beyond the present month, although some have sold as far ahead as the middle of March, particularly of the best southern West Virginia grades. Consumers hold that there is no telling how low the spot market will fall this spring and they are sure to get coal on the open market at better figures this summer than is possible on any contract they can get a producer to sign today. As a sample, it is noted that shippers are asking $3.25@$4 on pool 9 or its equivalent in the Eastern market, but a contract for high-volatile coal has been closed at $2.65.

Inquiries Made on European Shipments

There have been a number of inquiries from abroad for quotations on possible shipments to Europe, and one cargo of 10,000 tons for Italy has been closed. There is much talk in Germany of getting coal needed to replace that cut off from the Ruhr by shipments from this country. While Europe is talking about buying coal here, vessels are bringing English coal into our ports, two cargoes totaling nearly 12,000 tons reaching Baltimore the first week of this month. Any English coal coming in this year was bought last year.

Preliminary estimates for the week ended Feb. 10 indicate that the total tonnage of soft coal raised was 10,836,000 net tons, which is an increase of 150,000 net tons over the revised estimate for the week ended Feb. 3, says the Geological Survey.

Preliminary reports of cars loaded during the present week (Feb. 10-17) show 40,000 cars on Monday, a drop of 32,787 cars on Tuesday, and further decline to 28,428 cars on Thursday. Thus the indicated total output for the present week is about 2 per cent less for the week



Estimates of Production

(Net Tons)

	1922	1923
BITUMINOUS		
Jan. 27	9,615,000	10,985,000
Feb. 3 (*b*)	9,714,000	10,686,000
Feb. 10 (*a*)	10,309,000	10,836,000
Daily average	1,718,000	1,806,000
Coal year to date	359,664,000	346,226,000
Daily average coal year	1,357,000	1,350,000
ANTHRACITE		
Jan. 27	1,607,000	2,119,000
Feb. 3	1,811,000	2,056,000
Feb. 10	1,822,000	2,023,000
Coal year	76,419,000	42,754,000
COKE		
Feb. 3 (*b*)	122,000	348,000
Feb. 10 (*a*)	128,000	359,000
Calendar year	706,000	2,010,000

(*a*) Subject to revision. (*b*) Revised from last report

preceding, and may be expected to be about 10,600,000 tons.

Continued cold weather has maintained the pressure for anthracite deliveries, and as respects northern New York and parts of New England has greatly accentuated them. Towns on the line of the D. & H. have made numerous complaints to the Fuel Administrator of New York about inability to obtain hard coal. The matter is now well in hand, the Interstate Commerce Commission having interested itself at the request of the Federal Fuel Administrator. Emergency shipments have been forwarded.

Midwest Cuts Prices

By all odds the most interesting development of the past week in Chicago was a drop in the circular on southern Illinois prepared sizes Saturday, Feb. 17, from $5.50 to $4.75. Mine-run held at $3.50 and screenings at $2.50@ $2.75. This drop has been a long time coming but it created a stir of surprise because it broke on a Saturday and because the break came right in the middle of a cold wave scheduled by the weather cracks to last a few more days. Bell & Zoller made the first move at the opening of business that morning. The rest fell in line perforce as soon as they heard about it. A great deal of southern Illinois domestic coal has been selling considerably under the circular for some time, and in spite of the cold wave and a considerable call for coal in small lots from dealers everywhere the association price of $5.50 has been almost impossible to get.

Other prices were not materially affected at once by the southern Illinois cut. Central Illinois list still calls for $3.50 for lump, Fourth Vein Indiana, $4.25@$4.50 and western Kentucky $3.50@$3.75. Dealers' yards have been pretty well drained by a sudden heavy call for domestic coal during the past blizzardy week. They are expected to take on a good deal of coal during the next couple of weeks, especially southern Illinois at the new low price, which includes every size from 6-in. lump down to furnace egg. But spring is just around the corner and nobody looks for any long run of strong business.

All through the Middle West domestic demand has been heavy enough lately to give most mines all the running time they could get cars for, and with screenings thus produced in larger quantity, steam buyers hung back and waited for a softening. In slight degree it took effect in

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

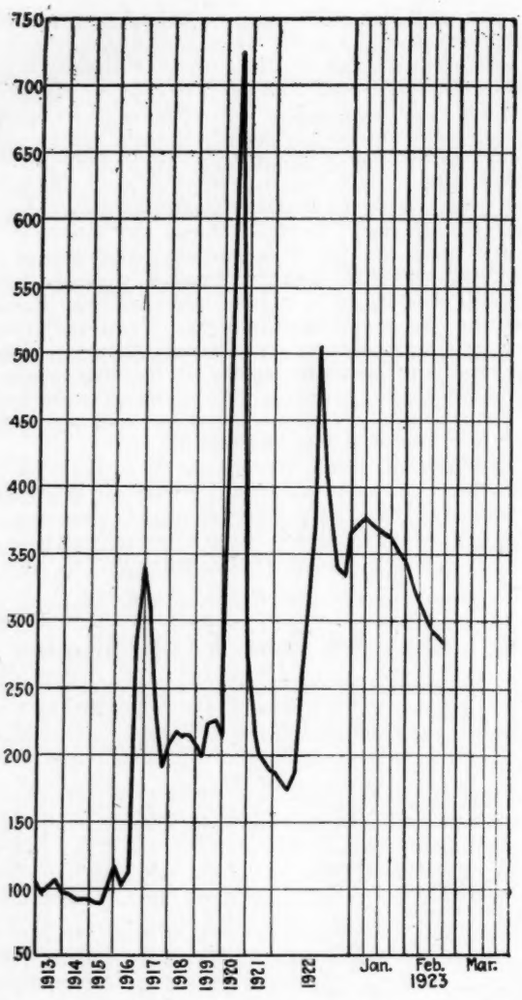
	Market Quoted	Feb. 19 1922	Feb. 5 1923	Feb. 12 1923	Feb. 19 1923†
Low-Volatile, Eastern					
Smokeless lump	Columbus	$3.25	$6.75	$7.00	$6.50@$7.50
Smokeless mine run	Columbus	2.10	5.50	4.75	*4.25@ 4.50*
Smokeless screenings	Columbus	1.55	5.50	4.75	*4.25@ 4.50*
Smokeless lump	Chicago	3.15	7.75	7.00	6.75@ 7.25
Smokeless mine run	Chicago	2.15	4.85	4.75	4.50@ 5.00
Smokeless lump	Cincinnati	3.15	6.50	7.10	**7.50@ 7.50**
Smokeless mine run	Cincinnati	1.75	5.25	4.75	4.50@ 5.00
Smokeless screenings	Cincinnati	1.15	5.25	4.50	*4.75@ 5.25*
*Smokeless mine run	Boston	4.55	8.00	7.15	*6.50@ 6.90*
Clearfield mine run	Boston	1.95	3.85	3.85	3.50@ 4.25
Cambria mine run	Boston	2.45	4.15	4.50	4.25@ 4.75
Somerset mine run	Boston	1.90	3.90	4.10	3.75@ 4.50
Pool 1 (Navy Standard)	New York	3.00	5.35	5.25	*4.50@ 5.15*
Pool 1 (Navy Standard)	Philadelphia	3.05	5.45	5.10	*4.65@ 5.00*
Pool 1 (Navy Standard)	Baltimore	2.55	4.60	4.60	.....
Pool 9 (Super. Low Vol.)	New York	2.50	4.75	4.60	*3.75@ 4.25*
Pool 9 (Super. Low Vol.)	Philadelphia	2.45	4.80	4.60	*4.20@ 4.50*
Pool 9 (Super. Low Vol.)	Baltimore	2.25	4.35	4.35	*3.50@ 3.75*
Pool 10 (H.Gr.Low Vol.)	New York	2.10	4.10	4.10	*3.25@ 4.15*
Pool 10 (H.Gr.Low Vol.)	Philadelphia	2.10	4.30	4.10	*3.65@ 3.80*
Pool 10 (H.Gr.Low Vol.)	Baltimore	2.05	4.10	4.00	*3.25*
Pool 11 (Low Vol.)	New York	1.75	3.50	3.35	*2.70@ 3.15*
Pool 11 (Low Vol.)	Philadelphia	1.75	3.25	3.10	*3.00@ 3.35*
Pool 11 (Low Vol.)	Baltimore	1.75	3.35	3.00	*2.60@ 2.75*
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	1.50	3.10	2.95	*2.40@ 2.80*
Pool 54-64 (Gas and St.)	Philadelphia	1.50	3.15	2.95	*2.65@ 2.90*
Pool 54-64 (Gas and St.)	Baltimore	1.40	3.00	2.85	*2.45*
Pittsburgh sc'd gas	Pittsburgh	2.65	4.50	4.10	4.00@ 4.25
Pittsburgh mine run (St.)	Pittsburgh	2.15	3.10	2.75	2.75
Pittsburgh slack (Gas)	Pittsburgh	1.65	3.30	3.25	*2.75@ 3.00*
Kanawha lump	Columbus	2.65	5.25	4.50	*4.00@ 4.65*
Kanawha mine run	Columbus	1.65	3.15	2.60	2.50@ 2.75
Kanawha screenings	Columbus	1.30	2.85	2.35	2.25@ 2.50
W. Va. lump	Cincinnati	2.35	4.60	4.25	4.00@ 4.50
W. Va. Gas mine run	Cincinnati	2.05	2.75	2.60	**3.25@ 3.50**
W. Va. Steam mine run	Cincinnati	1.50	2.75	2.60	**3.25@ 3.50**
W. Va. screenings	Cincinnati	1.20	2.25	2.25	**2.25@ 2.50**
Hocking lump	Columbus	2.65	4.50	4.50	*4.00@ 4.50*
Hocking mine run	Columbus	1.90	2.80	2.50	2.40@ 2.65
Hocking screenings	Columbus	1.30	2.60	2.10	2.00@ 2.25
Pitts. No. 8 lump	Cleveland	3.10	4.00	4.20	*4.00@ 4.50*
Pitts. No. 8 mine run	Cleveland	1.95	3.15	3.15	*3.15@ 3.25*
Pitts. No. 8 screenings	Cleveland	1.65	2.85	3.10	3.05@ 3.20
Midwest					
Franklin, Ill. lump	Chicago	3.30	5.35	5.35	*4.50@ 4.75*
Franklin, Ill. mine run	Chicago	2.50	3.85	3.85	*3.25@ 3.50*
Franklin, Ill. screenings	Chicago	2.00	2.60	2.55	2.50@ 2.60
Central, Ill. lump	Chicago	3.00	3.60	3.60	*3.25@ 3.50*
Central, Ill. mine run	Chicago	2.35	2.85	2.60	2.50@ 2.75
Central, Ill. screenings	Chicago	1.80	1.60	1.60	1.50@ 1.75
Ind. 4th Vein lump	Chicago	3.25	4.35	4.35	4.25@ 4.50
Ind. 4th Vein mine run	Chicago	2.50	3.10	3.10	3.00@ 3.25
Ind. 4th Vein screenings	Chicago	2.00	2.30	2.30	*2.00@ 2.25*
Ind. 5th Vein lump	Chicago	3.20	4.10	3.60	3.50@ 3.75
Ind. 5th Vein mine run	Chicago	2.25	3.10	2.60	2.50@ 2.75
Ind. 5th Vein screenings	Chicago	1.75	1.80	1.80	1.75@ 1.85
Standard lump	St. Louis	2.75	3.10	3.10	3.00@ 3.25
Standard mine run	St. Louis	1.95	2.25	2.25	2.25
Standard screenings	St. Louis	1.20	1.45	1.45	1.40@ 1.50
West Ky. lump	Louisville	2.50	3.85	3.85	*3.25@ 3.50*
West Ky. mine run	Louisville	1.85	2.35	2.35	*1.85@ 2.25*
West Ky. screenings	Louisville	1.40	1.90	2.10	*1.75@ 2.00*
West Ky. lump	Chicago	.....	3.85	3.85	*3.50@ 3.75*
West Ky. mine run	Chicago	.....	2.35	2.00	*1.90@ 2.00*
South and Southwest					
Big Seam lump	Birmingham	2.90	3.95	3.95	.....
Big Seam mine run	Birmingham	1.85	2.35	2.35	*2.00@ 2.25*
Big Seam (washed)	Birmingham	2.10	2.60	2.60	2.50@ 2.75
S. E. Ky. lump	Chicago	.....	6.00	4.85	*4.50@ 4.75*
S. E. Ky. mine run	Chicago	.....	3.25	2.85	2.75@ 3.00
S. E. Ky. lump	Louisville	2.60	5.75	5.25	*4.00@ 5.50*
S. E. Ky. mine run	Louisville	1.55	3.25	2.60	2.25@ 3.00
S. E. Ky. screenings	Louisville	1.20	2.85	2.35	2.25@ 2.50
S. E. Ky. lump	Cincinnati	2.50	4.35	4.25	*4.00*
S. E. Ky. mine run	Cincinnati	1.50	2.75	2.35	**2.50@ 2.75**
S. E. Ky. screenings	Cincinnati	1.10	2.25	2.10	**2.25@ 2.50**
Kansas lump	Kansas City	5.00	5.50	5.00	5.00
Kansas mine run	Kansas City	4.00	3.60	3.50	3.50
Kansas screenings	Kansas City	2.50	2.50	2.50	2.50

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Independent	Pre-Strike Company	Feb. 12, 1923 Independent	Feb. 12, 1923 Company	Feb 19, 1923† Independent	Feb 19, 1923† Company
Broken	New York	$2.34	.....	$7.60@$7.75	$9.00	$7.75@$8.25	$9.00	$7.75@$8.25
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85	.....	7.90@ 8.10	.....	7.90@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Egg	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@11.00	8.10@ 8.35	9.25@11.00	8.10@ 8.35
Egg	Chicago*	5.09	7.50	8.25	12.00@12.50	7.20@ 8.25	12.00@12.50	7.20@ 8.25
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Stove	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.25	12.00@12.50	7.35@ 8.25
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.20	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.15	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Chestnut	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.35	12.00@12.50	7.35@ 8.35
Range	New York	2.34	.....	.....	.....	8.25	.....	8.25
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45	7.50@11.00	6.15@ 6.30	7.50@11.00	6.15@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 9.50	6.15@ 6.20	7.00@ 9.00	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6.25	7.00@ 8.00	5.49@ 6.03	7.00@ 8.00	5.49@ 6.03
Buckwheat No. 1	New York	2.22	2.75@ 3.00	3.50	5.00@ 5.50	4.00@ 4.10	*4.50@ 5.50*	4.00@ 4.10
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	5.00@ 5.50	4.00	5.00@ 5.50	4.00
Rice	New York	2.22	2.00@ 2.50	2.50	2.25@ 2.75	2.75@ 3.00	**2.25@ 3.00**	2.75@ 3.00
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00
Barley	New York	2.22	1.50@ 1.85	1.50	1.50@ 2.00	1.50@ 2.00	1.50@ 2.00	1.50@ 2.00
Barley	Philadelphia	2.14	1.50@ 1.75	1.50	1.50@ 2.00	2.00	1.50@ 2.00	2.00
Birdseye	New York	2.22	.....	2.00@ 2.50	.....	2.10	.....	2.10

* Net tons, f.o.b. mines. † Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index 288, Week of Feb. 19, 1923. Average spot price for same period, $3.49. This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the U. S. weighed in accordance first with respect to the proportions each of slack, prepared tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

a number of places. It cannot be said the market is strong anywhere in this region. The Standard district east of St. Louis, Mo., felt car shortage probably more than any other region. Even the short lines have fallen down. In the Mt. Olive, Duquoin and Carterville regions mines worked a little less than three days during the week. Railroad tonnage fell off in most Illinois fields.

St. Louis Prices Weaken Too

In St. Louis everything moved hard during the week except Mt. Olive and Standard district. Though domestic demand was fair, the trade did not absorb high-priced fuels from elsewhere. All buying was picayunish. Wagonload trade was a good deal more prevalent than carload business both in the city and in the country. Steam was almost dead. Many small steam plants are picking up the little storage piles they have had on hand, and have stayed out of the market. At the end of the week prices were breaking noticeably.

In that city transportation is a hard problem. Both the Missouri Pacific and the Frisco railroads are hard put for power. Both are borrowing Terminal engines in order to keep the main lines open. Perishable freight is all that gets reasonably speedy dispatch through there. However the Missouri Pacific expects 75 engines out of the Alliance (Ohio) shops soon.

The Kentucky fields worked fair time during the past week, feeling enough domestic demand to absorb about all that was shipped under a 22-per cent car supply on the Louisville & Nashville and approximately 45 per cent furnished by the Illinois Central in the west. On Monday, Feb. 12, the Illinois Central supplied 980 cars out of 1,086 ordered, which was the best transportation performance seen in Kentucky in a long time.

While cold weather created a little better demand for prepared sizes at the same time it was noted that retailers were endeavoring to work yard stocks down and hold them low, with the result that the call was largely for coal at delivery point, or coal that is rolling.

There has been just a little railroad demand with some coal moving to utilities and gas plants, but the demand for gas coal is not especially heavy. Steel-mill demand is light, although consumption is reported heavy, and the big utility buyers probably will be forced back into the market before long, as a result of inroads that are being made on storage stocks.

Screenings are holding up very well in price, due to the fact that there has not been any overproduction, as general industrial consumption has been taking the fuel output. Movement is scattered, going to various sections of the country, but orders are not in large amounts and there is little demand other than for immediate shipment, which is placing the mines almost on a day-to-day basis.

There has been better buying in the South as a result of blizzards extending as far as the Gulf, while an excellent boating stage in the Ohio and Mississippi rivers has resulted in better movement from the west Kentucky field by river, although there are no large river shippers other than the West Kentucky Coal Co.

Northwest Trade Stiffenes

The continued cold and stormy weather kept the domestic business of the Northwest at top notch and stimulated industrial demand some. At the Head-of-the-Lakes prices rose. Splint advanced to $9.50@$10 for lump, $8.75 to $9 for pile-run and $6.75 for screenings with Youghiogheny and Hocking only 50c. off these ton prices. Pocahontas at the Duluth docks is selling for $13 for lump, $9.50 for pile-run and $8.25 for screenings with the supply short indeed, Coke sells for $12. The demand for these two anthracite substitutes is strong. Dealers both there and at Milwaukee are being bombarded by domestic orders they cannot fill. Rough weather has not only delayed all-rail coal but has seriously interfered with receipts by car ferry on the west side of Lake Michigan.

West Remains Tranquil

The stormy cold of last week caused no great hubbub in Utah, Colorado or the coal markets observed from Kansas City. In the mountain states producers found dealers were stocked to care for the swelling demand but that nobody was stocking up for continued cold. Utah slack demand has been heavier than domestic. Mining fields in the mountains as well as in Kansas and Oklahoma having been droning along with market enough to keep prices at the levels of a week ago.

Conditions Firmer in Ohio

A rigid embargo put against connecting lines of the north of the river was the outstanding matter of importance at Cincinnati. Frigid weather to the north and the whole of the immediate valley being caught in the grip of winter has given Cincinnati a chance to catch its breath. There has been a slight stiffening in prices. The market for smokeless coal is stiff. There is more mine-run bringing $4.75 than is being sold at the lower figure, the range being $4.50@$5.

At Columbus weather conditions caused a firmer tone. Buying was stimulated, but the net result was not to advance prices but rather to clean up a lot of coal which was on track. Steam business is slow as consumers are using reserve stocks. Retail dealers are slow to buy, not wishing to accumulate heavy stocks at this period.

The output of the eastern Ohio mines during the week ended Feb. 10 was 288,000 tons. This was the lowest of any week during the past six weeks, being about 20,000 tons under the preceding week. Receipts of bituminous coal at Cleveland were 2,645 cars, 1,940 cars consigned to industries

and 705 cars to retail dealers. This was a total of 242 cars below the receipts of the previous week. Figures given out by the operators indicate that the mines in the eastern Ohio district are not exceeding 35 per cent of full time because of poor car supply.

The Pittsburgh district is suffering from poor car supply. Demand for 2-in nut from New England has practically disappeared.

At Birmingham, Ala., production is on a basis of about 385,000 tons per week. The output for the first five weeks of 1923 was about 1,899,000 tons, or about 750,000 tons over the same period in 1922. Demand for domestic coals is strong but the commercial trade is soft, consumers aside from contract customers buying in limited quantities.

Bituminous Moves to New England on Permit

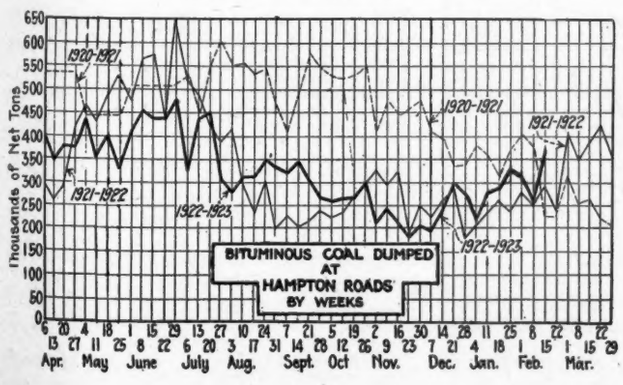
Shipments of bituminous coal to New England are at present moving only on permit, engine fuel alone excepted, and because of the accumulation at Rotterdam Junction the New York Central is even withholding permits for steam coal destined to Boston & Maine points. Receipts of commercial coal, therefore, are unusually light, although for heating purposes permits are freely granted to territory except that served by the Boston & Maine. The demand for water coal is slightly firmer, but when congestion at the Hudson River gateway is relieved the trade looks for much lower prices on Southern coals for inland delivery.

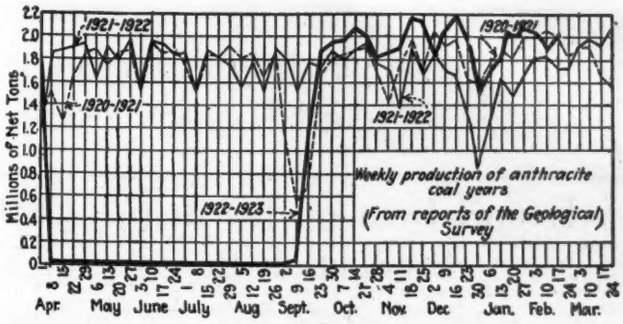
In New England the steam grades are in easy supply except all-rail, and for rail and water delivery, especially via Hampton Roads, quotations are even lower than a week ago. In fact, several of the smokeless agencies have recently made such determined efforts to place spot coal that prices are well down to a $6.50 level per gross ton f.o.b. Norfolk and Newport News. At Mystic Wharf, Boston, the West Virginia grades have offered freely at $9.75, and at Providence $9.25 has been quoted on No. 1 coals for prompt shipment.

Western demand for Pocahontas and New River is reported less insistent, and for that reason the coastwise market is being closely canvassed. Most shippers realize that the March average is reasonably certain to be less than in February and no efforts are spared to place coal that will hardly be mined until March 10 to 15. One or two operating interests have already named a price basis for April, but beyond this there is little disposition to name contract prices for deliveries after March.

Due to transportation difficulties there is a largely increased volume moving via the Philadelphia and New York piers. Gas companies, for instance, have chosen the water route from Philadelphia and New York in order to be assured continuing supplies, and certain of the railroads are taking much more coal by that route than would normally be the case. At Port Richmond January was the largest month for some years, and doubtless other piers would show a correspondingly large tonnage dumped for coatswise shipment.

The continued unfavorable weather has very much delayed movement of steamers and barges, and while a week ago freights were as low as at any time the past season there is enough shortage now of spot tonnage to make rates 10@20c. higher on large bottoms, while light-draft barges are in some cases quoted 25@35c. higher than during January. Receipts here of all grades have shown a marked falling off the past ten days as compared with receipts during January.


Thousands of Net Tons
1920-1921
1921-1922
1922-1923
BITUMINOUS COAL DUMPED AT HAMPTON ROADS BY WEEKS
Apr. May June July Aug. Sept. Oct Nov. Dec. Jan. Feb. Mar.


Millions of Net Tons
1921-1922
1920-1921
1922-1923
Weekly production of anthracite coal years
(From reports of the Geological Survey
Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar.

New York Buyers Hold Off

Buyers in the New York market are holding off. Operators in some instances are hungry for business. It is believed that some buildings that changed from coal to oil for heating purposes will soon return to the use of coal. In some instances owners of such buildings have made inquiries concerning the possibility of making contracts for coal. Cars at the local terminals numbered 2,327 on Feb. 16, a lower number than in several weeks. Shippers to a large degree have refrained from sending coal forward unless it is on order.

Export coal movement has been renewed from Baltimore, although in light volume, it is true. During January and February four vessels cleared from Baltimore with export coal, the total reaching only 6,768 tons. The largest single cargo was one of 2,649 tons, shipped on Feb. 5 to Havana. Two ships went to Cuba, one to Porto Rico and one to San Domingo. It is noteworthy that not a single cargo went to a European port. The import movement of Welsh coal consisted of 11,478 tons, one cargo being received from Cardiff on Feb. 5 and one from Barry on Feb. 9. This was the first coal importation since Feb. 28 of last year. The coal come to the Consolidated Gas, Electric Light & Power Co., the local lighting corporation. It was explained that this coal was on an old contract, made at a time when the fuel situation was very tight.

Anthracite

Retail dealers in various parts of the West who a few weeks ago cancelled on the belief the coal would not reach them in time to be sold last week asked shippers to reinstate their orders because of the continued cold weather. The producers have no difficulty in moving domestic sizes, but the steam coals are easier.

Production of anthracite showed a small decrease in the week ended Feb. 10. The total output, including mine fuel, local sales and dredge and washery output, is estimated at 2,023,000 net tons on the basis of 38,689 cars loaded as reported by the principal anthracite carriers. Preliminary returns for the first four days of the present week (Feb. 12-17) indicate an output of about 2,000,000 tons.

Coke

The spot market for coke seems to have practically ceased to decline. Quotations are slightly below those of last week. Foundry coke quotations range $8@$8.50. There is a prospect that coke production will increase during the next two or three months, as the high wages in the region probably will prevent men being drawn away for road building and other construction work.

Car Loadings, Surplusages and Shortages

	Cars Loaded	
	All Cars	Coal Cars
Week ended Feb. 3, 1923	865,675	189,773
Previous week	871,164	194,738
Same week in 1922	747,895	184,298

	Surplus Cars		Car Shortage	
	All Cars	Coal Cars		
Jan. 31, 1923	26,588	7,208	73,269	38,477
Same date in 1922	296,659	81,592	.....	.....

Foreign Market And Export News

Export Demand for British Coals Strong, Production Recedes Slightly

After a week of record-breaking production, the British output for the week ended Feb. 3 was reported at 5,601,000 tons, as compared with 5,644,000 tons the previous week, a decrease of 43,000 tons, according to a special cable to *Coal Age*.

Very strong conditions prevail in the Welsh coal market and the immediate prospects are very rosy. There is no lack of business, and if export facilities are increased the pre-war volume of business will be considerably exceeded.

So far as the Welsh market is concerned there is not any great amount of business actually accruing from the French occupation of the Ruhr coalfield. The European demand is heavy, France continues to buy well, Italy has improved. In the past week some substantial contracts have again been secured, and order-books will be well filled for many weeks to come. Belgium is in the market for heavy quantities of small coal.

In addition to the French and Belgian inquiries, there are also further inquiries from Spain, Holland, Norway, and a number of other foreign countries. South America is a big buyer, while the United States is taking Welsh coal to the extent of between 70,000 and 80,000 tons weekly. An order for 30,000 tons of coal has been placed by the Egyptian State Railways for delivery before March 25, while other considerable business includes coal for the north of Spain railways and for several of the French railway companies.

Market Falls at Hampton Roads

A continued falling market at Hampton Roads produced dullness in the trade, but gave promise of reaching a basis soon on which shippers may compete with British coal abroad. Movement coastwise showed some improvement, while bunker business held up well.

Recent storms delaying shipping caused an unusual store of coal to be laid up at the piers, but this was soon dissipated, and the car situation showed little improvement. General shipping appears to be on the increase, with the consequent boost in demand for bunker coal.

Cut in price of retail coal is thought to be imminent, in view of reduction in prices at the mines. Pocahontas coal is being delivered to dealers here at approximately $9.50, and the retail price is $14, while run of mine coal costs $6.75 on the yards and is sold for $11. The tone of the market was not strong, but prospects were unusually bright in view of the general belief that buying will pick up by March 1.

French Coals Firm

The interruption in the arrivals of German reparation fuel and the violent rise of imported British coal prices have increased the firmness of French industrial coals. There is some rumor of an increase in the prices of the Nord and Pas-de-Calais collieries. There is also a possibility, in the present circumstances, of a reversion to some amount of government control over the French coal trade in view of securing for essential industries and public services, such as metallurgy and railways, a complement of fuel supplies to replace the defaulting German deliveries.

The output of the Nord and Pas-de-Calais collieries is steadily increasing. On the other hand, a strike of the Saar miners is now being threatened, and if this eventuality was realized, a greater rarefaction of industrial coals on the French market would of course ensue.

From Jan. 1 up to Jan. 9, the following tonnages were shipped to France and Luxemburg:

From the Ruhr:	Metric tons
Coal	57.364
Coke	135.795
From Aix-la-Chapelle:	
Coal	3.901
Coke	9.410
From Cologne:	
Lignite briquets	16.841

Since Jan. 10, no shipment was made from the Ruhr; but the following were made from Aix-la-Chapelle and Cologne (also to France and Luxemburg): Aix-la-Chapelle (from Jan. 10 up to Jan. 18):

	Metric tons
Coal	1.729
Coke	9.809

Cologne (from Jan. 10 up to Jan. 13): 2.882 metric tons of lignite briquets.

On the other hand the following tonnages of German coke were received by French blast furnaces (the dates hereafter mentioned are dates of arrival, while the above ones were dates of shipment).

	Metric tons
From January 1st up to January 12th	151.500
From January 13th up to January 15th	18.200
On January 16th	4.600
January 17th	1.394
January 18th	603

Since then, no shipment of German coke was received, and a great number of blast-furnaces in the East and in Lorraine are now being blown out.

In December, the quantities of coal received in French seaports were as follows:

	Metric tons
British coals	1,455,645
German coals	99,519
Belgian coals	1,372
Dutch coals	543
Total	1,557,079

Export Clearances, Week Ended Feb. 17

FROM HAMPTON ROADS

For Cuba:	Tons
Dan. SS. Hans Maersk, for Havana	2,589
Nor. SS. Christian Krogh, for Havana	1,728
Am. Schr. Anthony D. Nichols, for St. Georges	1,036

FROM PHILADELPHIA

For Cuba:
Br. SS. Almors, for Havana ...

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.	Feb. 8	Feb. 15
Cars on hand	1,027	1,013
Tons on hand	69,314	64,679
Tons dumped for week	112,289	98,848
Tonnage waiting	17,300	3,575
Virginian Ry. piers, Sewalls Pt.		
Cars on hand	1,815	1,420
Tons on hand	107,750	83,670
Tons dumped for week	60,691	119,021
Tonnage waiting	43,563	13,251
C. & O. piers, Newport News		
Cars on hand	1,489	1,509
Tons on hand	87,285	79,790
Tons dumped for week	60,222	105,269
Tonnage waiting	9,185	24,311

Pier and Bunker Prices, Gross Tons

PIERS

	Feb. 10	Feb. 17†
Pool 9, New York	$7.25@$7.50	$7.25@$7.50
Pool 10, New York	6.75@ 7.00	*6.50@ 7.00*
Pool 11, New York	5.75@ 6.25	5.75@ 6.25
Pool 9, Philadelphia	7.25@ 7.60	*7.00@ 7.25*
Pool 10, Philadelphia	6.70@ 6.90	*6.50@ 6.75*
Pool 11, Philadelphia	6.00@ 6.40	*5.65@ 6.15*
Pool 1, Hamp. Roads	6.85@ 7.15	6.25@ 6.50
Pools 5-6-7 Hamp.Rds.	7.00	6.40
Pool 2, Hamp. Roads	6.85@ 7.15	6.25@ 6.50

BUNKERS

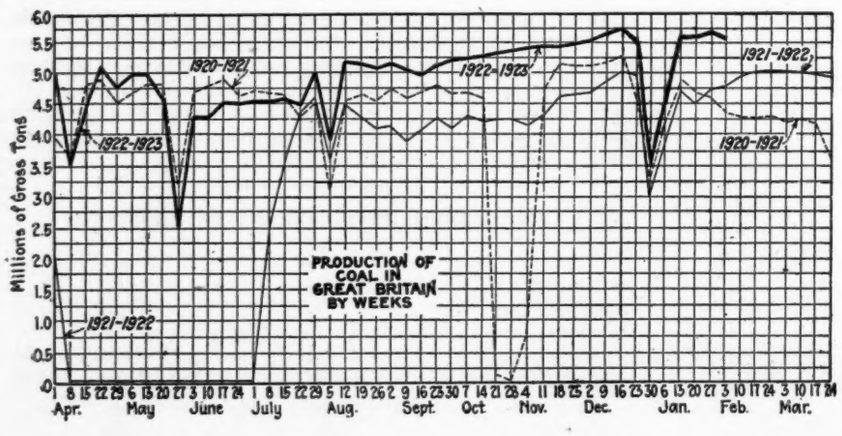
Pool 9, New York	$7.60@$7.85	**$7.65@$7.90**
Pool 10, New York	7.10@ 7.35	*6.90@ 7.40*
Pool 11, New York	6.10@ 6.60	**6.15@ 6.65**
Pool 9, Philadelphia	7.35@ 7.75	*7.30@ 7.60*
Pool 10, Philadelphia	7.00@ 7.25	*6.85@ 7.10*
Pool 11, Philadelphia	6.25@ 6.55	*6.00@ 6.40*
Pool 1, Hamp. Roads	7.15	6.50
Pool 2, Hamp. Roads	7.00	6.50

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to Coal Age

	Feb. 10	Feb. 17†
Admiralty, large	29s.6d.@30s.	*29s.@29s.6d.*
Steam, smalls	19s.@21s.6d.	*19s.@21s.*
Newcastle:		
Best steams	27s.6d.@28s.	**28s.**
Best gas	26s.6d.@27s.	**27s.@28s.**
Best bunkers	26s.@27s.6d.	*25s.6d.*

† Advances over previous week shown in **heavy** type: declines in *italics*.



News Items From Field and Trade

ALABAMA

The mine of the **United States Coal & Coke Co.** at Lynch celebrated Lincoln's birthday by **breaking the world's record for a day's output.** The tipple poured out 12,820 tons, or 256 gondolas of fifty tons capacity, in nine hours.

The County Coal Co. has increased its capital stock from $100,000 to $200,000. The company operates a mine on a spur of the Central of Georgia Ry. in the Cahaba valley, maintaining offices in the Jefferson County Bank Building Birmingham.

The Buck Coal Co., of Helena, Shelby County, has been incorporated by G. E. Warwick and others, with a capital of $10,000, all paid in and will engage in mining operations in Shelby County.

ARKANSAS

Mine No. 15 of the **Central Coal & Coke Co.** has resumed operations, having been idle since Feb. 4, 1921. The mine has been brought up to date with new equipment, including mining machines.

Settlement has been made of the entry dispute at the Blue Hill mine at Alexander, and on the advice of the arbitration commission work has been resumed.

COLORADO

Governor Sweet is strong for the Moffat tunnel project, which would open transportation facilities to one of the largest coal fields in the world. There is an available coal deposit in the new field estimated at 39 billion tons.

Colorado mines produced 9,140,545 tons of coal during eleven months of 1922 and part of December, 1922.

CONNECTICUT

Governor Templeton has put **Superintendent Robert T. Hurley** of the state police **in charge of the fuel situation** in the state. He succeeds Thomas W. Russell, who resigned as State Fuel Administrator.

DELAWARE

H. G. Horton, of the explosives department of the du Pont company has been named as Western representative of the contractors' division of that department, with headquarters in the McCormick Building, Chicago.

GEORGIA

T. I. Cleary, who recently opened an office in Atlanta for the sale of power-plant equipment, has been appointed Southern agent of the **Combustion Engineering Corporation.**

ILLINOIS

The Clover Leaf Coal Co. has been incorporated by Ralph B. Mitchell, H. W. Ragle and Wm. H. Warder. The capital is $150,000. Mitchell is in charge of the Cosgrove interests at Marion and Warder is attorney for them.

Officers of the Silver Creek Colliery Co., Galesburg, have been elected as follows: H. W. Stewart, Monmouth, president and treasurer; W. D. McCollough, Monmouth, vice-president, and George C. Gale, Galesburg, secretary. Ten years ago the company operated one mine with a production of 200 tons of coal daily. Now its two mines can produce 2,000 tons daily. The mines are electrically equipped and are among the best in Fulton County.

Drilling for coal will be begun soon in the fields **north of Edwardsville.** The first drill will be put down in Big Mooney Hollow, northwest of Edwardsville. Judging by the mine of the Newcastle Coal Co., it is probable that the hole must be sunk between 150 and 180 ft., to get coal. The Newcastle mine is 180 ft. deep. At least a dozen other holes will be drilled on farms upon which options have been secured by Edward Gaertner. The options were obtained on approximately 10,000 acres of land and tests will be made at a number of spots over the area.

Harvey Sconce, of Sidell, **has leased over 2,000 acres** of coal lands near that village. Four test drills have been put down in different sections of the leased area and several good veins have been discovered.

George F. Campbell, C. F. Hamilton and R. Crawford have incorporated the **Pyramid Coal Co.** at $225,000 to mine and handle coal.

Harry N. Taylor, of Chicago, head of the United States Distributing Corporation and who has succeeded Peter Kooi as president of the Sheridan Wyoming Coal Co., made an inspection trip through the Wyoming properties during the latter part of February.

An electrification program at the Moffat mine of the Moffat Coal Co., at Sparta, has been carried forward by the installation of a 525-kva. generator driven by a 26 x 32 in. Corliss engine in a new section of the power plant. Alternating current at 2,300 volts is transmitted along the surface and down a borehole a mile from the plant to three 150-kw. motor generator sets placed advantageously near the working faces which supply cutting machines with direct current at 275 volts. The main generator supplies current also for three pumps underground—two rotary portables and one duplex, which bring the water to the steam pump at the bottom—and to a 40-hp. motor driving the shaker screens and a motor of half that size in the shop building driving a power saw, emery wheel, drill press, bit sharpener and two power hammers. A 202-ft. brick stack built last summer attracts attention to the plant. Other improvements may be made at the mine soon.

Fire recently destroyed a portion of the top works of the **Jackson Coal Co.** at Hallidayboro, the cause of the fire being unknown at this time. The combination blacksmith and machine shop was totally destroyed while adjoining buildings were damaged. W. D. George is superintendent of the plant with offices in Hallidayboro.

The Joseph P. Rend Co., of Chicago, has filed articles of incorporation with a capital of $1,500,000 and will mine and deal in coal, oil, gases and the like. The incorporators are Joseph P. Rend, James E. Rend, George B. McKibbin.

The Ernest Coal Co., of Marion, has installed Nolan automatic cagers, of the style having two sets of horns, at their Pittsburg and Johnston City mines.

E. S. Van Sant is retiring from the coal business. He has already withdrawn from the **Globe Coal Co.,** of Chicago, of which he was vice-president and has sold his interest in that company. He is also to leave the **Eureka Coal & Dock Co.,** of Chicago. He has been a vice-president of that concern also.

Executives and mine officials of the Union Colliery Co. were banqueted recently at the St. Nicholas Hotel, Duquoin. The event is an annual one and was enjoyed by everyone who attended. Dr. L. E. Young, president, and E. S. Stevens, chief auditor, both of St. Louis, were present at the banquet, the former acting as toastmaster throughout the evening.

Reports have been confirmed that the **Lumaghi Coal Co.** of St. Louis **will soon sink a new coal mine near Johnston City.** The new mine will be started on a location on the James Hartwell farm near Johnston City and work will probably be started in a few weeks. First reports were that the St. Louis Coke & Chemical Co., which concern makes coke and byproducts from Southern Illinois coal at its Granite City (Ill.) plant, was going to finance the sinking of the new mine but these have proven false. A. B. Dowell, of St. Louis, has obtained the contract for the sinking of the shaft.

INDIANA

Suits have been filed at Petersburg **to foreclose mortgages** on coal property held by the Vulcan Coal Co. Seven suits were filed by farmers who had contracted to sell about 1,000 acres of good stripping property to the company, which was to pay a third of the purchase price in money and give a first mortgage on the farms for the other two payments. The farmers allege the payments are overdue. The farmers seek to recover the land so that they can sell it to other coal companies.

The **Bogle mines, No. 1 and No. 3,** near Blanford, seven miles west of Clingon, **have been sold to the Binkley Coal Co.** The Binkley company bought the Pine Ridge mine, near New Goshen, from the Bogle company about two years ago. The company owns another mine in the Herrin field. Since the death about a year ago of Mr. Bogle, his properties have been in the hands of an administrator. Henry Stark, formerly secretary of the company, has been president. He is to go with the Binkley company as sales manager under R. B. Starek, vice-president. Mahlon B. Stark, of Clinton, a brother, is manager of the two Bogle mines and it is reported will remain in that capacity. These mines employ about 1,000 men. A new preparation plant is to be installed at the No. 1 mine.

The Linton Summit Coal Co., Linton, raised 2,343 tons of coal in 1,087 hoists on Feb. 8. This is the more remarkable when the primitive conditions at the mine are realized. It is a one-sided mine with a single loaded and single empty track shaft bottom.

The Mt. Pleasant Coal Co., of Terre Haute, has increased its capital stock from $25,000 to $50,000.

Coal operators of Indiana are considerably elated over the decision of the Indiana Supreme Court knocking out the legislative enactment of 1913 under which employers must pay twice a month and in cash. The hold-up evil has been severe of late, and there have been numerous cases where payrolls were stolen, with the result that employers in various lines have been anxious to see a decision on a test case. In fact some of the employers at some points were steadily violating the law. They argued that a check was merely an order on a company treasurer for cash and that the bank as a depository of the company drawing the check was acting as treasurer.

IOWA

The Adelphi Coal & Mining Co., Des Moines, has been incorporated with capital of $50,000 by B. B. Huisman, president and treasurer; B. F. Foreman, vice-president; R. H. Cook, secretary, and Frank L. Hall, assistant secretary.

To protect Sioux City coal consumers, the dealers of the city who are members of the Coal Exchange have under consideration a plan whereby **all dealers will adopt an emblem guaranteeing the weight** and quality of all coal delivered. This plan follows that adopted in many other cities.

The Pearson Coal Co., Clarinda, is opening a new mine west of that city. A switch track will be built to connect with the Tarkio branch of the Burlington R.R.

KANSAS

Part of the top works, including fan house and cribbing to the bottom of the airshaft, were **destroyed by fire** recently at mine 21 of the **J. R. Crowe Coal Mining Co.** Possibly two months will be needed to rebuild.

H. P. McCaustland is trustee for a syndicate to develop a part of the 20,000-acre coal field in Clark County, 16 miles west of Bucklin.

The Tulsa County Coal Co. has been incorporated for $50,000 by B. C. Connor, H. O. Tallman and E. E. Henning. They have acquired a large acreage near Pleasanton.

Robert Howell, a shotfirer, was killed and Mine No. 16 of the Jackson Walker Coal Mining Co., at Capaldo, near Pittsburgh, was badly damaged by an explosion resulting from a **"blow-through" shot,** Jan. 31. James Sherwood, Kansas state mine inspector, discovered that the shot that caused the explosion lacked only 6 in. of being drilled through into an adjoining room. The shot, heavily charged with black powder, ignited gas and dust in the mine, and timbers were set fire more than 600 ft. away.

Frank Schopflin was elected vice-president of the Central Coal & Coke Co., at Kansas City, Mo., Feb. 7, to succeed Harry N. Taylor, who recently resigned to become head of the United States Distributing Corporation. Mr. Schopflin came to the company in 1902 as an assistant to the president, C. F. Keith. During the last year he has been general manager of the lumber department of the concern. Whether Mr. Schopflin eventually will assume the duties performed by Mr. Taylor, who was active directing head of the coal department of the company, has not been announced. For the present, various heads of departments in that branch of the firm's activities are reporting directly to Mr. Keith. Before entering the service of the Central Coal & Coke Co., Mr. Schopflin was in the Kansas City offices of several railroads.

A **co-operative** organization of miners, operating under the name of the Osage City Labor Exchange has **purchased the mine of the McCune Coal Co.**, near McCune. The organization had been operating the mine six months under lease. It plans to sink a second shaft early this spring in order to extend development of the mine without violating a Kansas law which limits the number of men employed in a single shaft mine.

Two damage suits for personal injuries which resulted from pit cars running wild down inclines of strip mines and striking workers were filed recently in District Court at Pittsburgh. One, for $7,623.48, against the Mackie Clemens Coal Co., was filed by Asa Musgrove, a general utility man. The other, for $5,541, against the Pittsburgh-Oskaloosa Coal Co., was filed by Fred W. Kirk, a track layer.

KENTUCKY

The Virginia Coal & Coke Corp., a new organization with headquarters in Roanoke, Va., is contemplating **extensive development in the eastern Kentucky coal fields.** It is said the firm will spend $1,000,000 in development, part of which will be done in Harlan, Perry and Letcher counties. It is reported the company will build a branch line in Harlan County, while in Letcher County the main development will be in the Elkhorn field, arrangements for workings there already having been consummated.

The Edyth Coal Co., of Beattyville, which was recently incorporated for $20,000, has organized with Robert Jameson as president-manager and Beatrice Jameson as secretary-treasurer. The company has taken over the properties of the Sturgis Creek Coal Co. and will develop 600 acres of coal land at Idamay. The company expects to have a daily capacity of 400 tons of coal and has purchased the equipment necessary to carry out the development work.

The Kentucky Cooperative Coal Corporation has been incorporated at Lexington, with a capital of $30,000, and C. C. Perry, C. R. Taylor and Ernest C. Brown as the incorporators.

The Flynn Coal & Coke Co. has been incorporated at Sunnyside by D. K. Flynn, H. B. Beury and A. S. Guthrie with a capital of $50,000. The post-office address of the company is Grafton, W. Va.

The Morganette Coal Co., which was recently incorporated at Morganette, has perfected its organization with the election of the following officers: President and manager, T. R. Ragland; secretary, C. O. Dunn; treasurer, W. A. Stanley. The company has taken over the leaseholds of the Hawley Coal Co., the Combs Coal Co. and the W. E. Griffiths Coal Co., all in Fayette County. The company has about 1,600 acres under development and the present output is about 500 tons a day.

The Fire Creek Pocahontas Fuel Co. has been incorporated at Huntington with a capital of $150,000. The incorporators are H. A. Smith, of Mt. Hope, and G. T. Smith and William G. Harvie, both of Huntington.

The Coal Exchange Co. has been incorporated at Covelle, with a capital of $500,000, and with D. C. Schonthal, W. E. Deegans and G. D. Miller as the incorporators.

The Coe Pocahontas Coal Co. has been incorporated at Covelle, with a capital of $200,000, and has its post office address at Romney. The incorporators are E. J. McQuaid and C. E. Lilley, both of Bluefield, and H. D. Smith, of McComas.

T. P. Colgan, of Middlesboro, has been employed by the State Tax Commission to collaborate with J. L. Smith, of Danville, in making a survey of the coal fields for tax assessment.

Amended articles of incorporation have been approved by the State Department at Frankfort for the **Amburgy Coal Co.**, Louisville, with mines in eastern Kentucky. The capital has been increased from $175,000 to $225,000. **The name has been changed to the Letcher Coal Mining Co.**

Whitesburg reports that the **Elkhorn and Hazard fields are again humming** with coal production, after a temporary tie-up as a result of landslides on the B. & O., which dammed up Elkhorn Creek, flooding several mining towns and closing down the Consolidation Coal Co., and many other big operations, until the B & O. was able to clear the tracks. It took the better part of a week to get the road open again. It is reported that mines in that section are getting a good car supply and are quite busy.

The Southern Coal Co., has filed suit in the Jefferson Circuit Court, Louisville, **against the Mountain Gem Coal Co.**, asking for damages of $3,238.07, alleging that breach of contract in failure to deliver fifty cars of coal. The buyer claims to have been forced to take a loss of the amount sued for in filling orders from the open market.

Western Kentucky Democratic leaders meeting at the Watterson Hotel, Louisville, **proposed to run James R. Rash**, of the St. Bernard Coal Co., Earlington and Madisonville, **for governor** of the state, and showed opposition to other western Kentucky men who have been mentioned as possible candidates. The meeting also favored a general income tax for the state instead of a coal tonnage tax, as is being argued in some circles.

State militiamen are in charge of the situation at Corbin, where there has been considerable violence, the town having been unsettled ever since the railroad strikes last summer. Corbin is a big junction point of three branches of the Louisville & Nashville R.R., and a shop town. The company never gave in to the unions, and miners in the district and loafers sympathized with the railroad workers. A curfew law has been passed by the council, and an effort is being made to clear up the situation. A workingmen's boarding house was recently dynamited and several men have been shot. This is an important point to coal operators of southern Kentucky and Tennessee.

MISSOURI

Mining permits have been granted by the Circuit Court at Huntsville to the **Black Diamond Coal Co.**, of Huntsville, and to **John Lumb**, of Huntsville, both of whom furnished bonds. Mining activities have increased in the western part of Randolph County to such an extent that new mines will be opened and operations of several old shafts resumed in the near future.

Initial steps have been taken at Huntsville **to open another coal field** and men employed at the Powhattan mine have taken the initiative and it is believed that the business men of the city as well as the Chamber of Commerce will assist in the project. It will be necessary to build a track, considerable trestling and tipple to the new field and the miners have generously signed up to donate a week or more of their time to accomplish the job.

A local syndicate is forming to **exploit the coal acreage around Prairie Hill.** Reports have it that a number of shafts will go down this spring.

NEW JERSEY

Halden-Kelley Coal Co., Inc., Clearfield, Pa., announces the opening of a branch office at 38-40 Clinton St., Newark, N. J.

NEW YORK

Justice Lydon in the Supreme Court of Manhattan has **set aside a verdict returned by a jury last month against Willard, Sutherland & Co.**, bunkering contractors, in favor of the old Tidewater Coal Exchange. The action was brought by Receiver Coyle of the Tidewater Exchange to set aside certain settlements between debtor and creditor members. In his opinion Justice Lydon stated that the jury's verdict was clearly against the weight of evidence submitted by Willard, Sutherland & Co., that the latter's accounts with the old exchange have been completely balanced, and that the exchange has no claim whatever upon Willard, Sutherland & Co.

Douglas M. Deringer, for several years fuel engineer with the New York Central R.R., has resigned from that company and become associated with Dickson & Eddy, New York City.

Raymond O'Brien, formerly of the Allan Coal Mining Co., has been engaged as manager of coal and coke sales of the Iron Trade Products Co., of Pittsburgh, Pa., for the New York district with headquarters at 30 Church St., New York City.

OHIO

As a result of a recent decision of the State Supreme Court, holding that the Southern Ohio Power Co., of Maine, operating the big electric power station at Floodwood, Athens County, and supplying current to a number of Hocking Valley municipalities, cannot operate in Ohio, reorganization is proposed whereby a new Ohio corporation known as the Southern Ohio Power Co. is to acquire the properties of the old Maine corporation and the various distributing companies. The court held that the Maine corporation is in fact a public utility because of the interlocking directorates with the distributing companies it sells its current to, and under Ohio laws no other than an Ohio corporation can engage in the electric light and power business. Application to the State Public Utilities Commission to approve the reorganization plans calls for an issuance of $3,200,000 by the new Ohio corporation to be exchanged for assets of the other companies, estimated at that value.

The Cantwell Coal Co., Bridgeport, has been chartered with a capital of $10 000 to mine coal in the Pittsburgh No. 8 district. Incorporators are John E. Barth, Robert Barth, William Rennis, Jacob Barth and Martin Cantwell.

The tipple of the White Coal Co., located near Bellaire, was **destroyed by fire**, entailing a loss of $7,000. Just a day previous the **warehouse** of the Pultney mine of the Cambria Collieries Co. was **destroyed by fire** causing a loss of $5,000.

James C. Layne, Jr., Cincinnati; Albert E. Scherm, Cincinnati; Joseph G. Walton, Pittsburgh, and John Daker, Cleveland, have been admitted as partners to the firm of Eaton, Rhodes & Co., Cincinnati. William G. Eaton and Frank R. Rhodes are the other members of the firm.

OKLAHOMA

Prospecting for location of coal goes on **along the Oklahoma-Kansas line.** The latest acreage is in the so-called Angola field, which is independent of the Edna-Welch field. Favorable reports come from the drillers all over Labette County. The two heavy leasers in the new fields around Welch are the Central Coal & Coke Co. and the Hartford Valley Coal Co. Railroad extensions are to be put through this spring. The Central Coal & Coke Co. is reported to have paid in cash for leases more than $25,000 for acreages near Hollow, Okla. In the Quapaw territory report has it that the Charles M. Schwab interests have leases on 2,700 acres, and $25,000 to $30,000 has been spent by the agents of these interests.

The Oak Ridge Coal Co., capital $200,000, has been organized by Vince Davis, Ray Morgan, James Hilling and others, to sink a mine at Red Oak.

PENNSYLVANIA

Louis J. Bradley has joined the Keister-MacQuown Fuel Co., Pittsburgh, as Eastern sales manager. Mr. Bradley has been actively identified with the bituminous trade since 1909. Starting as weighmaster at the Edna Mine of the Pittsburgh & Baltimore Coal Co. in Westmoreland County, his early training carried him through the various positions of inspector, shipper, mine clerk and superintendent of the mine to the position of Eastern representative for the United Coal Co. with headquarters in Philadelphia, Pa. With this company he was identified until it was disbanded, when he joined the Quemahoning Coal Co. During 1917-18 he was engaged in war work, resuming coal work at the close of the war. The Keister-MacQuown Fuel Co. plans to engage extensively in export business.

LOUIS J. BRADLEY

The following bituminous coal companies were recently incorporated at the State Department at Harrisburg: **Baton Coal Co.**, Pittsburgh, $50,000; Chester J. Nicklas, W. W. Booth and George S. Baton, Pittsburgh, incorporators. **Mt. Hope Mining Co.**, Kersey, $10,000; A. C. Hau and W. G. Hau, Kersey, Pa., and Joseph J. Szukalski, Buffalo, N. Y., incorporators. **Walnut Hill Coal Co.**, Connellsville, $10,000; Louis Hetzel, John Swope and William G. Duncan, Connellsville, incorporators.

A state charter has been issued to the **George H. Foster Coal Co.**, Pittsburgh. The capital stock of the company is $25,000 and E. E. Beardsley, Point Marion, is treasurer and one of the three incorporators, the others being George H. Foster, Pittsburgh, and H. E. Hackney, Uniontown. The purpose of the corporation is the mining and producing of coal and the manufacture of coke.

Since the No. 7 breaker of the Susquehanna Collieries Co. burned down Feb. 6 the company is making arrangements to prepare the coal at its Glen Lyon Mines and hopes to have the colliery in operation soon.

Fourteen hundred men went on strike Feb. 13 at the Kaska Williams colliery of the Lehigh Coal & Navigation Co. as a result of a dispute over wage rates and mining conditions. Approximately 8,300 men at the other fourteen collieries of the company had walked out on the preceding day for the same reason. Three thousand mine workers in the Mt. Carmel district quit Feb. 12 at the Reliance and Alaska collieries of the Philadelphia & Reading Coal and Iron Co., in sympathy with the miners at Locust Spring, who claim that men working in slopes received $8.01 a yard at one place and $11 03 for the same in another. District officials of the Miners' union are making an effort to settle the difficulty. They declined to state whether the strike had the sanction of the union.

Three thousand anthracite mine workers employed by the Susquehanna Collieries Co. at Nanticoke and Glen Lyon struck Feb. 16 because of local grievances. One of the complaints is that the company is asking the men to pay 90c. a ton more for coal, due to the fact that a breaker had burned, compelling the company to haul the fuel a longer distance.

The following officers and directors of the mining section of the **Engineers' Society of Western Pennsylvania** have been elected for the ensuing year: Chairman, H. M. Eavanson; vice chairman E. H. Coxe; Directors, J. O. Durkee, J. R. Elliott, M. D. Gibson, J. M. Rayburn and E. S. Taylor.

The following bituminous-coal companies were granted charters at the State Department at Harrisburg recently: **Ramsey's Run Coal Mining Co.**, Indiana; capital stock, $50,000. **Appalacha Coal Co.**, Pittsburgh, $150,000. **Anderson-Rees Coal Co.**, Pittsburgh, $15,000.

Representative David Fowler, Lackawanna County, on Feb. 7 introduced a bill in the House **to repeal the anthracite tax law.** The bill is similar to that offered the week before by Representative Wilson G. Sarig, Berks County. Thirty-five members from the anthracite regions of the state have formed an organization which will work for the repeal of the tax. The new organization will ask the House Ways and Means Committee for a hearing on one of the two identical repealers now before that committee and will urge that one of the bills be reported out affirmatively.

A bill prohibiting understandings and agreements which would prevent, restrict, obstruct or delay the sale or delivery of coal and making it **unlawful to refuse the sale or delivery of coal** was introduced in the State Senate Feb. 12 by Senator George Woodward, of Philadelphia. Persons who violate the provisions of the measure are guilty of a misdemeanor and upon conviction shall be sentenced to pay a fine of $25 for each ton of coal the sale or delivery of which was refused or delayed. The bill relates to dealers and officers of coal companies and also to partnerships and officers of corporations engaged in the operation of any mines or collieries.

The Senate bill providing for grading of coal was **reported out of committee this week with an affirmative recommendation** and passed by the Senate on first reading. When it came up in its second reading stage on Feb. 13 it was recommitted to the Judiciary General Committee.

Representative David Fowler, Lackawanna, has introduced a bill in the House **amending an act of 1921** relating to the examination of inspectors in the anthracite mines. The measure increases the maximum age of applicants from fifty to sixty years.

Indications that there will be **no mine-cave legislation put before the Legislature this year** by members of the House from the anthracite district of the state. It is said that local efforts will be made to meet the surface subsidence trouble.

The end of the Stavitsky bill, prohibiting sheriffs from aiding in quelling riots and disturbances without a call from local police authorities, came soon after it was introduced. The House Law and Order Committee reported it out during the past week with a negative recommendation.

The Bethlehem Steel Co. purposes building a new battery of coke ovens at its Lackawanna plant.

Attorney George R. McLean, of Wilkes-Barre, has been named a director in the Lehigh & Wilkes-Barre Coal Co., to succeed the late H. H. Ashley.

The Jefferson & Clearfield Coal & Iron Co., of Indiana, Pa., has declared a dividend of $1 a share on the common stock, payable Feb. 15 to stock of record Feb. 13. This is the first dividend ordered on the common stock since November, 1920, when a disbursement of $8 a share was made, which was the first distribution since 1905. A stock dividend of 150 per cent was distributed Jan. 18, last.

RHODE ISLAND

State Fuel Administrator George H. Webb has received **many complaints of inferior coal** sold in that state. Seventeen samples taken from the bins of firms against whom complaints had been made showed that the combustible material ranged from 40.5 per cent to 76.4 per cent.

UTAH

The U. S. Fuel Co. has appointed **A. D. Pierson,** formerly of the Utah Fuel Co., fuel agent in charge of railroad tonnage.

Following urgent requests from numerous farmers' organizations in Idaho, the Denver & Rio Grande Western Ry. and Oregon Short Line have established **a special emergency rate on coal from Utah mines** to various points in the Gem state. The rate will average about 50c. lower than at present, with the present rate on slack as the minimum in each instance. The new rate is an emergency measure and is designed specially for Idaho farmers. It will also have the effect of lessening the advantage Wyoming mines now have over Utah mines in this field.

It seems that the law passed six years ago setting up a Public Utilities Commission will not be repealed though it is likely to be modified. There is a feeling, a canvass of the legislators shows, that the public would be left without adequate protection if the commission were abolished. Senator Peters, of Brigham City, has introduced two bills on the subject, in addition to the one by another legislator which would repeal the act. One of the new bills would make it compulsory for municipalities to have a representative at all rate hearings and other business affecting price or quality of service. The other bill would take from the commission the power to create a monopoly by granting but one person at a time the privilege of conducting transportation service over the roads of the state.

WEST VIRGINIA

W. E. Hatfield, H. H. Randolph and W. H. Bronson, of Williamson, have incorporated the **Pigeon Creek Coal Co.,** at Bias, with a capital stock of $50,000.

The Millstone Coal Co. has been incorporated at Burch, with a capital stock of $10,000. The incorporators are G. W. Hatfield, H. H. Randolp and G. T. Conley, of Williamson.

J. A. Adams and W. R. Harris, of Morgantown, and D. C. Evans, of Uniontown, Pa., have incorporated the **D. & A. Coal Co.** at Morgantown, with a capital of $25,000.

John Laing, president of the Morrison Coal Co., of Charleston, has announced that the company has under contemplation the **purchase of 4,600 acres of coal land** in the Winding Gulf district.

The Glenbar Coal Co. has been formed at Clarksburg, with a capital of $100,000. The incorporators are L. O. Knipp, of Philadelphia; C. Valdois, of Clarksburg, and C. M. Knipp, of Glenside.

T. W. Miller and C. B. Cushwa, both of Youngstown, Ohio, have become associated with A. M. Cunningham, of Elkins, in the incorporation of the **Rich Mountain Sewell Coal Co.** at Elkins with a capital stock of $75,000.

The Morganette Coal Company at Beckley, W. Va., has been incorporated for $400,000 and has as its incorporators J. Q. Hutchinson, J. R. Ragland, and C. H. Meador.

The Morrison Coal Co., of McGraws, of which John Laing, of Charleston, W. Va., is president, **is purchasing mine motors, machines and cars,** preparatory to developing coal lands. The company has under development 4,600 acres, which promise an output of 1,500 tons daily.

The McKone Coal Co. has been incorporated at Tunnelton, with a capital stock of $200,000. The incorporators are J. J. McCone, L. H. Borgman and F. W. Borgman.

Charles Prafeta and D. A. Ritchie, of Fairmount, and Charles Canarata, of Uniontown, Pa., have formed the **Prafeta Coal Co.** here, with a capital of $10,000.

The Shady Fuel Co. has been incorporated at Oxley with a capital of $25,000; J. A. Lilly, A. A. Skaggs and J. H. Wilson are the incorporators.

Not since 1918, when 27,576,710 tons was handled, has the Chesapeake & Ohio been able to move so large a tonnage of coal as it did during 1922, when **25,703,490 tons were transported** to market from the five great coal fields on the general western division of the road.

The Virginian Ry., it is understood, **will convert into coal-carrying cars several hundred stock cars** which have been lying idle since the war. The Government acquired the stock cars for the Virginian during the war at a cost of approximately $2,000,000 and threw them back on that road after the war was over. As the road has no cattle shipments to speak of, it is proposed to scrap the bodies of the cars and utilize the running gear alone, constructing steel box cars.

Fire destroyed the tipple at the Hickory Camp mine of the Paint Creek Coal Mining Co. about the middle of January, three dwelling houses adjoining the tipple also being destroyed. The fire had its origin in one of the three dwelling houses. Until a new tipple can be constructed the mine will be closed down.

Announcement has been made by Secretary A. H. Crane of the West Virginia Coal & Coke Co., of the appointment of **J. W. Bischoff as vice-president and general manager** of the company.

WISCONSIN

The Packard Coal Mining Co., of Columbus, Ohio, announces the **opening of a Northwestern office** in the New First Wisconsin Bank Bldg., Milwaukee, in charge of Charles Becker.

The Reiss Steamship Co., an auxiliary of the C. Reiss Coal Co., of Sheboygan, **has placed an order for a new steel steamer.** This will make the company's fleet consist of ten steel vessels, with a combined capacity of about 85,000 tons. The steamers are employed by the coal company, which maintains coal docks at Sheboygan, Manitowoc, Two Rivers, Green Bay, Ashland and Superior, Wis.; at Escanaba, Mich. and Waukegan, Ill.

The warehouse and coal sheds of the **Saul Sinaiko Coal & Fuel Co.,** at Madison, burned early on the morning of Feb. 6, causing a loss estimated at $25,000.

CANADA

Men at all the mines in the Drumheller field went on strike on Feb. 1, following a reduction in the number of men employed at the Hy-Grade collieries. The miners demanded that the men at Hy-Grade be kept on the payroll and that the work be distributed among them proportionately, a course that the management refused to adopt. On the morning of Feb. 2 all pits were picketed, and miners were not allowed to go to work. Robert Livett, of the International Board of the United Mine Workers, came up from Calgary, and ordered the men to go back to work, an order with which the men refused to comply. Mr. Livett stated that some drastic course would have to be taken to discipline the men. There is a large quantity of coal on the tracks, so no serious shortage is feared, unless the strike should be a long one.

The Canadian Pacific Ry. completed a branch line last November from Acme to Drumheller, Alta., and since then **there have been five new coal mines opened** and put on a shipping basis along this line. The coal is of excellent quality for domestic use. Charles Murphy, general manager of the Western lines, observes that there is no likelihood of a fuel famine in this particular territory, inasmuch as he has seen farmers digging coal from the surface and shoveling it into waiting wagons.

Thomas J. Brown, formerly manager of the Nova Scotia Steel & Coal works at Sydney Mines, has assumed the duties of **Deputy Minister of Works and Mines** at Halifax. He succeeds Hiram Donkin, who retired from office on Feb. 1 after serving since 1904.

WASHINGTON, D. C.

Bids are solicited for the transportation of two cargoes of Navy coal from Hampton Roads, Va., one to the Melville, (R. I.) Naval Fuel Depot and one to the Portsmouth, (N. H.) Navy Yard in vessels of American registry. To the first-named destination the cargo will consist of 4,000-6,500 gross tons, to be loaded at Hampton Roads about Feb. 28 and discharged at a guaranteed daily rate of 500 tons. The cargo to the Portsmouth Navy Yard also is to comprise 4,000-6,500 gross tons, to be loaded about March 3 and discharged at the rate of 400 tons per day.

Publications Received

Proceedings of the twenty-fifth annual meeting of the American Society for Testing Materials, held at Atlantic City, N. J., June 27-30, 1922. Vol. 22. Part I contains committee reports and new and revised tentative standards and has 1,023 pages. Part II contains technical papers and has 591 pages. Two coal papers: "A Rational Basis for Coal-Purchase Specifications," by E. B. Ricketts, and "Forms of Specifications for Purchasing Coal," by Hubb Bell, with a discussion on coal-purchase specifications, appear among the technical papers.

Twelfth Annual Report by the Director of the Bureau of Mines to the Secretary of the Interior for the fiscal year ended June 30, 1922. Pp. 33; 6x9 in.; organization chart and tables.

Proceedings of the Conference on Mine Taxation, held in conjunction with the twenty-fifth annual convention of the American Mining Congress at Cleveland, Ohio, Oct. 9-14, 1922. Pp. 174; 6x9 in.

Second Annual Report of the Federal Power Commission for the fiscal year ended June 30, 1922. Pp. 309; 6x9 in.; tables.

Fourteenth Census of the United States, taken in year 1920. Mines and Quarries, 1919. Vol. XI; 443 pp.; tables. Prepared under the supervision of Eugene F. Hartley, chief statistician for manufactures, and Frank J. Katz, special agent for mines and quarries.

An Investigation of the Properties of Chilled Iron Car Wheels, by J. M. Snodgrass and F. H. Guldner. Engineering Experiment Station, University of Illinois, Urbana, Ill. Part II; bulletin No. 134; pp. 72; 6x9 in.; illustrated. Covers the determination of the strains which may occur within a car wheel and a study of the limitations of present designs.

Chemical Engineering. Rensselaer Polytechnic Institute Bulletin, Troy, N. Y. Vol. 21; pp. 30; 5x8 in.; illustrated. Describes the course in chemistry at the Institute.

Trade Literature

American Hose and Spray Nozzles. The American Safety Lamp and Mine Supply Co., Scranton, Pa. Bulletin No. 641. Two-page folio giving sizes and prices of iron, brass and bronze nozzles.

Reading Cast Steel Valves. Reading Steel Casting Co., Inc., Bridgeport, Conn. Pp. 8; 6x9 in.; illustrated. Describes its new cast steel gate valves designed for 350 lbs. working pressure at a total temperature not exceeding 800 deg.; or 500 lbs. working pressure at a total temperature below 100 deg.

The International Combustion Engineering Corp., of 43 Broad St., New York City, has issued a 16-page catalog covering all its products, including stokers, fuel oil burners, Lopulco pulverized fuel systems and coal dryer, ash conveyors, Green pressure waterback, sealflex arch, fuel retarder, etc. The book is 8x11 in. and well illustrated.

Duraloy. Cutler Steel Co., Pittsburgh, Pa. Bulletin No. 221. A four-page description of the physical properties, composition and characteristics strength at high temperatures, machining and welding qualities of duraloy, also its oxidation and heat resistance.

Safe Tapping and Stopping. The Medart Co., St. Louis, Mo. Four-page folder describing apparatus invented for removing hazards from cupola tending.

The following catalogs have been published by the De Laval Steam Turbine Co., Trenton, N. J.: **Instruction Manual Small Single-Stage Centrifugal Pumps,** Type F. Pp. 12; 8x11 in.; illustrated. Gives complete tables and instructions for selecting pumps for different conditions, explains how to determine the proper speeds and how to select piping, valves, fittings, and driving pulley or motor. **Plants and Products.** Catalog P. Pp. 24; 4x9 in.; illustrated. Briefly describes the single- and multi-stage steam turbines, centrifugal pumps, blowers and compressors, and speed-reducing gears manufactured by this concern. **Equipment for Marquette Cement Manufacturing Co.** This is a four-page folder describing the power equipment at this plant where direct current is used.

How Hell Gate Station Handles Coal with Maine Electric Machinery. The Maine Electric Co., Portland, Me. Bulletin No. 4. Pp. 12, 9x12, illustrated. Describes the large coal-handling hoists installed at the Hell Gate Station of the United Electric Light & Power Co., said to be the largest and most rapid electric coal hoist of its kind in the United States.

Traffic News

Reduction of freight rates on coal shipped from Indiana fields to Irvington, a suburb of Indianapolis, and from Clinton, Ind., to Putnamville, Ind., is sought in exceptions to an Interstate Commerce Commission order on which evidence has just been heard before an examiner of the commission. Rates on coal shipped to Irvington are higher than the rates on coal shipped to Indianapolis. Shippers want them to be made the same.

Obituary

James D. Bastin, 83, died at Stanford, Ky., Feb. 12. He is survived by two sons who are coal producers, these being John W. Bastin, of Central City, Ky., and Sam M. Bastin, an operator in the Letcher County field.

Charles K. Wagner, one of the well known operators in the Big Sandy Field of the Northeast Kentucky district, died at the Kessler-Hatfield Hospital, Huntington, W. Va., Sunday, Feb. 11, from injuries received in an accident at the mine of the Elkhornseam Collieries Co., Elkseam, Ky., one of the mines in which he was interested. The accident, which occurred Feb. 7, was caused by a runaway car on the incline which is used to convey the men to and from their work in the mine.

Mr. Wagner became interested in this field in 1917 and had been actively engaged in its development and progress since. He and Charles W. Connor became closely affiliated in the Elkhornseam Collieries Co., of which he was secretary and treasurer. He also was president of the Excelsior Byproduct Coal Co., Shelbiana, Ky., and vice-president of the Kentucky Block Fuel Co., Jonancy, Ky., located on the Sandy Valley & Elkhorn Division of the B. & O. in Pike County. He also was interested in several operating companies in the Pocahontas Field on the N. & W. He was 42 years of age and is survived by his wife and four children.

Death has claimed **Heber J. Stowell,** oldest coal prospector in Carbon County, Utah. Mr. Stowell was born in Ogden. Among the mines he located was the Kenilworth, now operated by the Independent Coal & Coke Co.

Association Activities

Northern West Virginia Operator's Association

The annual meeting of the Northern West Virginia Operators' Association held in Fairmont on Feb. 13 was attended by about 100 operators from all parts of northern West Virginia. John A. Clark, Jr., of Fairmont, was elected president of the association, succeeding A. Lisle White, who was presented with a gold watch.

Other officers elected at the annual meeting were as follows: George S. Brackett, Fairmont, executive vice-president; J. Oliver Caldwell, Fairmont, secretary; A. C. Beeson, Annabelle, treasurer; E. S. McCullough, Fairmont, labor commissioner.

The question of car rating absorbed the attention of the members of the association during a part of the meeting. The scale committee which had just completed negotiations at Baltimore for a new scale presented its report. During the course of the meeting a resolution was adopted, the sense of which was that the association would recognize and stand by its associate members. Instead of having its banquet in the evening, the association staged that function at one o'clock in the afternoon at the Fairmont Hotel. There were splendid addresses by Director Smith of the U. S. Geological Survey and Attorney Wilbur LaRoe, of Washington, D. C.

Upper Potomac Coal Association

Members of the Upper Potomac Coal Association met in annual session at Cumberland, Md., Feb. 10, the attendance representing a large portion of the tonnage of the Upper Potomac and Georges Creek fields. Keen interest was manifested in the discussion of problems affecting the coal industry. The following directors were elected: W. F. Ambrose, Cumberland; J. G. Emmons, Philadelphia; R. A. Smith of Blaine, W. Va.; S. D. Brady, Fairmont; A. S. Brady, Elkins; Marsh Dean, Elk Garden; T. M. Dodson, Bethlehem, Pa.; Douglas Gorman, Baltimore, Md., and Carroll Pattison, Bloomington, Md.

At the banquet which followed the annual meeting addresses were delivered by Senator Sutherland, of West Virginia; Judge A. A. Daub, of Cumberland, and B. F. Biser, of Cumberland. All the speakers joined in urging business men to bring about industrial rest. In his address Senator Sutherland said, among other things: "If a failure of fuel production should persist through unfortunate misunderstanding or clash of interests, the specter of government operation or ownership will again arise. It is quite possible that if the patience of the public becomes wearied because of an uncertainty of fuel supplies, drastic and unwholesome legislation may be expected."

Monongahela Coal Association

Work was planned for the year at the meeting of the Monongahela Coal Association held in Morgantown during the second week in February, when consideration was given to a number of questions of particular interest to members of the association. John H. Jones, of Pittsburgh, elected president at the annual meeting, presided and announced the appointment of committees. Following the meeting of the membership of the association, the board of directors held a session.

Coming Meetings

The Rocky Mountain Coal Mining Institute will hold its winter meeting Feb. 26-28 in Denver, Colo. Secretary, Benedict Shubart, Boston Building, Denver, Colo.

American Institute of Mining and Metallurgical Engineers will hold its annual meeting Feb. 19-22, 1923, at the Engineering Societies Building, New York City. Secretary, F. F. Sharpless, New York City.

International Chamber of Commerce will hold its second general meeting in Roma, Italy, March 19-26.

American Society for Testing Materials will hold its annual meeting at the Chalfonte-Haddon Hall Hotel, Atlantic City, N. J., beginning June 25 and continuing throughout the week. Secretary, E. Marburg, Philadelphia, Pa.

The Colorado & New Mexico Coal Operators' Association will hold its annual meeting June 20 at Denver, Col. Secretary, F. O. Sandstrom, Denver, Col.

Northwestern Pennsylvania Coal Operators' Association will hold its annual meeting March 6 at the William Penn Hotel, Pittsburgh, Pa. Secretary, T. F. Diefenderfer, Butler, Pa.

Canadian Institute of Mining and Metallurgy's annual meeting will be held March 7, 8 and 9 at the Mount Royal Hotel, Montreal, Quebec, Canada. Secretary, George C. Mackenzie, Montreal, Quebec, Canada.

The Electric Power Club's annual meeting will be held at the Homestead, Hot Springs, Va., Dec. 11-14. Executive secretary, S. N. Clarkson, Cleveland, Ohio.

Indiana Bituminous Coal Operators' Association will hold its annual meeting March 14 at Terre Haute, Ind. Secretary, P. H. Penna, Terre Haute, Ind.

National Foreign Trade Council will hold its annual conference May 2-4 at New Orleans, La. Secretary, O. K. Davis, 1 Hanover Square, New York City.

Southern Appalachian Coal Operators' Association will hold its annual meeting Feb. 23 at Knoxville, Tenn. Secretary, R. E. Howe, Knoxville, Tenn.

The executive board of the **Coal Mining Institute of America** will meet in Pittsburgh, Pa., Saturday, March 3.

The Gas and Fuel Section of the American Chemical Society is arranging a second sectional meeting at the New Haven meeting of the American Chemical Society during the first week in April. The section program will consist of papers on gas and fuel chemistry and a symposium on motor fuels, held jointly with the petroleum division.

The eleventh annual meeting of the Chamber of Commerce of the United States will be held in New York City May 7-10.

The Tri-State Coal Stripping Association will hold its annaul meeting March 1 at Pittsburgh, Pa. Secretary, Geo. A. Blackford, Wheeling, West Va.